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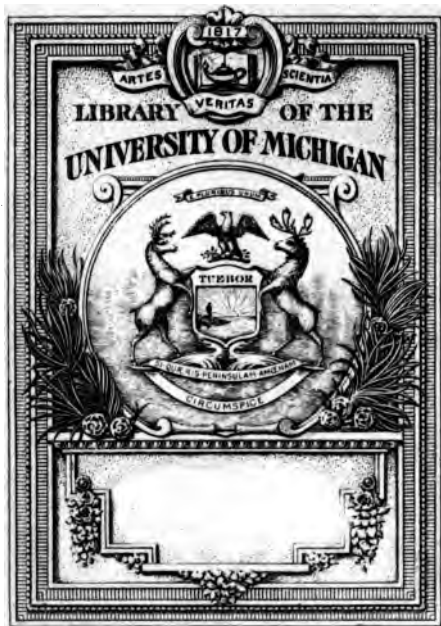
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CITY SCHOOL EXPENDITURES

THE VARIABILITY AND INTERRELATION OF
THE PRINCIPAL ITEMS

BY

GEORGE DRAYTON STRAYER, Ph.D.



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CITY SCHOOL EXPENDITURES

THE VARIABILITY AND INTERRELATION OF THE PRINCIPAL ITEMS

By GEORGE DRAYTON STRAYER, A.B., Johns Hopkins University;
Fellow in Education, Teachers College, 1904-05
Ph.D. Columbia University, 1905

INTRODUCTION

The importance of the subject-matter of Mr. Strayer's investigation needs no comment. The methods, being in some respects new in the literature of education, deserve some comment.

It is impossible to gain adequate insight into facts as complex as those of school expenses and school achievements without some use of technical statistical methods. If Mr. Strayer's report puzzles some readers by its tables of frequency, its constant use of the median rather than the average as a measure of central tendency, its coefficients of correlation and their corrections, it is of necessity. The facts could not otherwise be handled properly—in some cases not at all.

The one matter of technique which needs explanation and perhaps apology is the use of the Pearson Coefficient of Correlation. This measure of the general relation of a deviation of the amount of one item in the budget from the typical amount of that item to the deviation in the same city of some other item from its typical amount, is indispensable but necessarily obscure. It is indispensable: (1) because it presents to the mind in a single figure a mass of individual relationships which

in their detailed form leave no definite impress on even the most skilled examiner of statistics (*e. g.*, let any one try to measure accurately the facts of the relation of teachers' salaries to janitors' salaries without its aid); (2) because it makes all relationships between any one and any other of the same order of facts comparable and commensurate (*e. g.*, let any one without its use say whether the total cost per pupil is more or less closely followed by the cost per pupil of text-books and supplies than by that for janitors' salaries). It is necessarily obscure: (1) because the general tendency for which it stands represents a result which an indefinite number of different arrangements of relationships could all equally give, and (2) because the variability of the individual relationships, from which it rescues us in part, still remains to prevent any prophecy of the coefficient's implication concerning any special case other than a most complicated statement of probabilities. Readers who are familiar with modern statistics will have gained a concrete acquaintance with coefficients which will make tables XXXVII, XXXIX, etc., clear and emphatic. To others they cannot be. On the whole, although the arithmetical labor of calculating these coefficients is enormous, they should be used in all studies of relationships of mental and social traits. Those calculated by Mr. Strayer will increase in importance as we obtain from the budgets of private schools, colleges, business corporations, and the like, similar coefficients to compare with them.

One other feature of Mr. Strayer's method of presentation needs comment—his careful arrangement of the individual measures from which all his later results are derived. The publication of these in full enables any critic to verify the conclusions, any investigator of the same problem to combine new data with them so as to get better advantages from both, and any investigator of other problems to use in his own way a body of facts which could be obtained now only at a cost of hundreds of hours, and in a few years could not be obtained at all. The reader who is irritated, as well as awed, by the pages of individual records must remember that in the social sciences lumping facts into averages and totals conceals far more truth than it reveals, and destroys half the value of the record to the expert.

EDWARD L. THORNDIKE

April, 1905

THE PROBLEM

The financial problem in connection with our public schools is fundamental. We may devise improved courses of study, we may provide for the proper training of teachers, our aim may be sound and our method well grounded, and still we must have the money to build and properly equip and maintain buildings, to provide the necessary books and supplies, to hire the competent supervisors and teachers, or all will count for naught. We believe that our schools have advanced in this country during the past fifty years, and we know that along with this advance the amount of money spent for public education has increased in a ratio altogether out of proportion to the number of people educated. Still further, we believe that those sections of our country which to-day spend the most money for public education are the sections which are doing the best work. Especially with the growth of cities and the great increase of urban population has the amount of money spent for public schools grown larger. But even the great increase in expenditure, amounting in some cases to ten- or even twenty-fold during the past fifty years, has not been sufficient to satisfy the demands of those who believe in the efficacy and necessity of public education in our modern democracy.

President Eliot, in his address before the Connecticut State Teachers' Association in 1902, argued for more liberal expenditures for public education, in order that we might accomplish by this means certain desirable ends which we have as yet failed to attain. He sums up his argument in one part of his address as follows: "My first argument in support of this proposition is that, as a nation and on the whole, in spite of many successes, we have met with many failures of various sorts in our efforts to educate the whole people, and still see before us many unsurmounted difficulties. It is indisputable that we have experienced a profound disappointment in the results thus far obtained from a widely diffused popular education. It was a stupendous undertaking at the start, and the difficulties have increased with every generation. Our forefathers expected miracles of prompt enlightenment; and we are seriously disappointed that popular education has not defended

us against barbarian vices like drunkenness and gambling, against increase of crime and insanity, and against innumerable delusions, impostures, and follies. We ought to spend more public money on schools, because the present expenditures do not produce all the good results which were expected and may reasonably be aimed at."¹

In a second address to the New Hampshire State Teachers' Association in the same year, President Eliot maintained that more money should be given to the public schools, because of the great gains that have been made in public education. Some of the improvements to which he called attention were the establishment of kindergartens, improvement in the curricula of elementary schools, increase in the number of high schools, improvement in school buildings, new kinds of schools (manual training, the mechanic arts high school, the evening school, and the vacation school), improvement in normal schools, improved methods of selecting and appointing teachers, pensions for teachers, increased employment of educational experts in supervising and executive functions of urban school systems, the increased use of high schools, the introduction of the costly elective system, better university teachers, improved professional training, increased opportunity for the higher education of women, and increased attention given to the welfare of the body. Every one of these educational improvements, says President Eliot, "has been costly; but every one has justified itself in the eyes of the tax-payers, or of those who voluntarily pay for it; not one would now be recalled, and the total result encourages the expectation that large new expenditures would commend themselves to the people at the start, and in the end would prove to be both profitable in the material sense and civilizing in the humane sense.

"You have doubtless noticed that the gains I have reported are chiefly in education above fourteen years of age. There has been improvement in the first eight grades since 1870, but it is relatively small. Yet the great majority of American children do not get beyond the eighth grade. Philanthropists, social philosophers, and friends of free institutions, is that the fit educational outcome of a century of democracy in an unde-

¹ Eliot, *More Money for the Public Schools*, p. 23.

veloped country of immense natural resources? Leaders and guides of the people, is that what you think just and safe? People of the United States, is that what you desire and intend?"¹

There is nothing unusual nor radical in this appeal of President Eliot. In almost every educational journal one can find arguments for increased expenditures for teachers' salaries. In many states laws have been passed or proposed which declare that all text-books shall be furnished free to children. In every community new school buildings are built better than the old. More attention is given to proper heating, lighting, and ventilating. All this means an increase in school expenditures. Along with this great increase in expenditure and with the demand for still greater sums of money for public education, there has arisen the necessity for greater ability in the handling of school moneys, and, on the part of the tax-payers who furnish the money, a desire to know how the money is spent and what results are obtained.

Those who have controlled our free public schools have always had the double function of attending to the business affairs of the school system, as well as looking after the matter of instruction. In the early days, when the chief expenditure was for the teacher's salary and there were very few other items of expense, it was a comparatively simple matter to administer the finances of the then small school systems. With the great growth of cities and school systems, together with the enormous increase in amount and variety of expenditures, the problem of business administration has become very complex. This demand for expert ability in dealing with the business affairs of the schools has been met in different ways. In some instances a special committee of the school board or committee has been given charge of the financial affairs of the schools. In many cases the superintendent has not only supervised instruction, but has also been the business manager for the school system. In other cases, notably in Cleveland and Indianapolis, a special executive officer has been provided to look after the business affairs. There is a growing feeling that the business affairs of the large school systems demand expert ability, and that it is financially profitable for a large city to employ a business

¹ Eliot, *More Money for the Public Schools*, pp. 125-127.

director to look after the financial interests of the school system. The Chicago Commission, appointed in 1898, recommended that the function of the school board "be chiefly legislative, the executive work being delegated to the superintendent and business manager."¹ However desirable it may be to have a special executive officer whose duty it shall be to look after the business affairs of the schools, the fact remains that in vastly the greater majority of cities of over ten thousand inhabitants this work is now done by the school board, by the superintendent of schools, or by the board and the superintendent in co-operation with each other.

In the year 1899 there reported to the Department of Superintendence of the National Educational Association the Committee on Uniform Financial Reports, which had been appointed at the previous meeting. Something of the purpose for which this Committee was appointed, as well as their recommendations, may be found in the following quotation:

"While local conditions enter into the necessities for expense in any public school system, yet one of the most useful means of estimating proper expenditures should be afforded by a study of the financial school reports of other similar cities or districts. As these reports are at present made, they are of little use in this respect. Items given in one report are omitted from another. Items of income and outgo are differently grouped in different reports, and the statement is made in such a way that it is impossible to separate the items for the purpose of re-classification. In getting the cost of education per child, different items are put into the total cost of education, which forms the dividend, while the divisor is sometimes the number enrolled, sometimes the average number in daily membership, sometimes the average number in daily attendance.

"One of the chief studies of a wise administrator of schools is to make the cost of education per child as low as is consistent with the best service. Attention to this and to the comparative study of the reports for a period of years, now that most of our school systems are established on a somewhat similar plan, should give an idea of the average or normal cost of education per child. Having this, the manager of schools may know how expense in his system differs from this normal stan-

¹ *Report of the Chicago Educational Commission.*

dard, and, if not normal, why it is above or below. This knowledge cannot be arrived at, however, until the same items are included when comparing cost of education, and the same divisor is used when obtaining the average. By careful comparative study, railroad men know the average cost of hauling freight per ton per mile, and the cost per mile of transporting a passenger. Those administering schools should be as well informed upon the cost of education."¹ Concerning the form of report recommended by this Committee, we shall have something to say later.

Just at this point it is interesting to verify their statement with regard to the non-uniformity of reports. Unfortunately, the work of this Committee seems to have had little effect upon the reports which have been issued since 1899. The sources of information concerning school expenditures are: the Report of the Commissioner of Education for the United States, the several State Reports, and the City Reports. In the Report of the Commissioner of Education, school expenditures for cities of over 8000 inhabitants are classified under four heads, namely: (1) permanent investment and lasting improvements, (2) teaching and supervision, (3) current and incidental expenses, and (4) evening schools. It is hardly necessary to state that if any comparison among different cities is to be made, a further distribution of these items is necessary.

The item "teaching and supervision" contains several items of expenditure which should be compared with each other; while the item "current and incidental expenses" is so general that we are unable to tell anything about the use which is made of the money.

If we turn to State Reports we are again disappointed. The Massachusetts State Report classifies city school expenditures under the following heads: teachers' salaries; conveyance of pupils; fuel and care of premises; school committee, including clerical aid and truant service; superintendent of schools; textbooks and school supplies; school sundries; alterations and permanent repairs; new schoolhouses; and ordinary repairs. This classification is superior to that found in the Report of the Commissioner of Education, because of the more detailed information which it gives. One might wish, however, that fuel and

¹*Proceedings of the National Educational Association, 1899, p. 345.*

the care of school premises could be given as separate items; and when we remember the difference in the salaries paid to high school teachers and to elementary school teachers, it would seem that these items should be further subdivided.

In the Pennsylvania State Report expenditures are classified as follows: schoolhouses, purchasing, building, renting, etc.; teachers' wages; cost of school text-books; cost of school supplies other than text-books including maps, globes, etc.; fuel, contingencies, fees of collectors, and all other expenses. It is easily seen that the Pennsylvania Report gives less definite information than the Massachusetts Report, and that a comparison of the expenditures for cities of the two States could not be made from the material available.

The New Jersey State Report classifies expenditures as follows: teachers' salaries; fuel and janitors' salaries; building and repairing; debt and interest; manual training; text-books, apparatus, and supplies; transportation of pupils; other school purposes. Again it is hardly necessary to suggest that the item "teachers' salaries" is not sufficiently specific for the purpose of comparison. It may be well enough for the information of patrons to account for fuel and janitors' salaries under one head, but if one were interested in the relation between janitors' salaries and the amount of fuel consumed, this classification would scarcely answer the purpose.

In the New York State Reports there is still less information given concerning the money expended by cities for school purposes.

The City Reports, so far as I have been able to examine them, are little more satisfactory than the State and National Reports. Items which are given in one report, are omitted or combined with other items in another report in such manner as to make comparisons impossible. Frequently there is included under a single head an item of expenditure which properly belongs to current expense for maintenance and operation, and another which might better be classified as falling under the head of permanent equipment.

In about half of the reports which I have examined, teachers' salaries are given as a single item. Miscellaneous expenses, that is, the money which is spent but not definitely accounted for, amounts to from one to twenty-five per cent. of the entire

expenditure. In one report, school furniture and rent are given as one item. In another, janitors' and truant officers' salaries are given as a single item, without any explanation as to whether the janitor acts as truant officer or not. Text-books, supplies, permanent equipment or apparatus make one item of another report. Fuel and repairs are grouped together in another, and so on through the entire list. Mr. Jesse D. Burks, in an unpublished study, found three thousand different heads under which information concerning city school systems was given in the annual reports.

It was because of this state of affairs that the Committee of the National Educational Association on Uniform Financial Reports was appointed; and it was with the same problem in view that President Butler, in a discussion of a paper on "Taxation and Teachers' Salaries" before the National Educational Association in 1902, said: "What we need and need very badly in this country, is not only a more scientific system of taxation, but more adequate and exact information as to what should be the relative cost of various elements in the disbursements of our cities, towns, and villages. For example, no one knows just what ought to be the normal cost of the public school system of a city of 250,000 people. We know how rapidly such population increases, and how many children of school age come under the care of the community each year, but we do not know what the school system should normally cost, or what should be the proportion of its cost to the total cost of maintaining the local government. Nor do we know what proportion of a city school system should be charged to teachers' salaries, what to supplies, what to supervision, and what to the other items which make up the total bill of expense. Here is a field of investigation which is of surpassing interest, not only to school officer and superintendent, but to every intelligent citizen. It cannot be entered upon too soon, for the subject is one that goes to the very bottom of our public life."¹

The problem which we have undertaken in this investigation is a part of that which President Butler so clearly outlined. This study will deal with the distribution of the money spent for schools among the various items of the budget. Whether or not we may hope to determine the norm which

¹ *Proceedings of the National Educational Association, 1902, p. 329.*

should be followed, of this we are certain, that some information concerning current practice can be secured, and that a solution to some of the problems which arise may be suggested because of this more adequate knowledge of present conditions.

DATA

The data which furnish the basis of this study were secured from fifty-eight cities of between ten and fifty thousand inhabitants, located in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. To the Superintendent of Schools in each city the following blank form was sent:

Teachers College
Columbia University
New York

Data for research in Educational Administration. School Expenditures for the year 190 and 190 , in the city of..... state of.....

I. Current Expenses:

		\$	
1. Salaries for supervision (Superintendent, Assistant, Deputy, or Associate Superintendents, and Principals).....			
2. Salaries for business administration (salaries of members of the Board of Education, Business Manager, Superintendent of Buildings and Grounds, Clerks to Board of Education, etc., etc.).....			
3. Salaries of Janitors (number and aggregate of their salaries).....	No.		
4. Salaries of Matrons or Maids in connection with Kindergartens and Baths (number and aggregate of their salaries).....			
5. Salaries of Truant Officers (number and aggregate of their salaries).....			
6. <i>Salaries for Teaching:</i>			
Number of Elementary School (Primary and Grammar) Teachers and aggregate of their salaries...			
Number of High School Teachers and aggregate of their salaries.....			
Number of Kindergarten Teachers and aggregate of their salaries.....			
Number of Evening School Teachers and aggregate of their salaries.....			

City School Expenditures

II

6. Salaries for Teaching: (Continued.)		No.	\$
Number of Truant School Teachers and aggregate of their salaries.....			
Number of Teachers' Training School Teachers and aggregate of their salaries.....			
Number of Special Teachers or supervisors of special subjects (Manual Training, Cooking, Sewing, Drawing, Music, Nature Study, Penmanship, Physical Education, etc.) and aggregate of their salaries.....			
Number of Vacation School and Play Ground Teachers and aggregate of their salaries.....			
What are the daily wages of (1) Carpenters, \$.....			
(2) Bricklayers, \$..... (3) Day Laborers, \$.....			
in your city?.....			
7 Text-books, including copy- and drawing-books and repairs to books.....			
8. Supplies consumed by pupils (paper, pencils, ink, chalk, pens and pen-holders, erasers, laboratory, manual training, cooking, and kindergarten supplies, etc., etc.).....			
9. Janitors' Supplies (brooms, brushes, towels and washing of towels, toilet paper, soap, etc., etc.).....			
10. Supplies for Board of Education, Superintendents', and Principals' offices.....			
11. Fuel.....			
12. Light and Power.....			
13. Water.....			
14. Ordinary repairs to Buildings and Grounds.....			
15. Rent.....			
16. School Census.....			
17. Transportation of Pupils.....			
18. Insurance.....			
19. Freight and Expressage.....			
20. Printing and Advertising.....			
21. Telegraph, Postage, etc.....			
22. Telephone.....			
23. Other Current Expenses:			
.....			
.....			
.....			
Are books furnished free to indigents?.....to all students?.....What supplies are furnished free to indigents?.....			
.....			
.....			
.....to all students?.....			
.....			
.....			

II. Plant and Permanent Equipment:		
1. New buildings and sites, furniture and furnishings <i>for new buildings</i> , and permanent improvements to buildings and grounds.....	.....	.....
2. Furniture (exclusive of that put in new buildings).....	.....	.....
3. Permanent equipment or apparatus (scientific apparatus, tools or apparatus for manual training and cooking, typewriters for commercial departments, maps, charts, globes, etc., etc.).....	.....	.....
4. Reference and Library Books.....	.....	.....
III. Paid on Principal of Bonded Debt.....	.....	.....
IV. Paid on Principal of Loans.....	.....	.....
V. Paid for Interest.....	.....	.....
VI. All other Expenditures:		
(If important expenditures have been omitted in the above classification, will you kindly itemize such expenditures below.)		
.....		
.....		
.....		
<i>Total Expenditures for the year:</i>		
VII. Bonded School Debt at end of the year.....	.....	.....
VIII. Paid for Evening Schools [total current expenses, included in (I) above].....	.....	.....
IX. Paid for Teachers Training Schools [total current expenses, included in (I) above].....	.....	.....

Cities of between ten and fifty thousand inhabitants were chosen because this is the type city in the United States. Of 562 cities of over eight thousand inhabitants, according to the census of 1900, 481 cities are between eight and fifty thousand. Not only is the city above fifty thousand much less common than the city of fewer inhabitants, but it is more apt to present problems peculiar to itself, and hence does not admit so well of comparison. Even if it had been possible to secure information from as many of the larger cities, they would necessarily have been so scattered, and conditions of climate, rate of growth in population, general economic welfare, tradition with regard to public education, etc., would have been so different that a comparison could not so well have been made.

After having chosen the size of city to be studied, the terri-

tory was limited to the states named above because it was felt that in this region conditions were very similar.

In the territory covered there are 117 cities of between ten and fifty thousand. For the school year 1902-1903 the blank form given above was filled out by fifty-eight cities. For the school year 1903-1904 similar data were secured from thirty of these cities before this investigation was completed.

The form of report used was drawn up with two purposes kept constantly in mind, namely: first, that the several items of expenditure should be so reported that they would admit of comparison; second, that as far as possible the whole expenditure should be reported under proper heads—that the item generally termed “miscellaneous expenses” should, so far as possible, be eliminated. It will be noticed, however, that a place for reporting such expenditures was allowed to remain on the blank. In preparing this form, we considered carefully the form of report recommended by the Committee of the National Educational Association, and have in some parts followed their classification. On the other hand, it seemed to us that in more than one instance their classification was not the best, because it did not provide for sufficient detail. The first item under expenditures in that report is salaries of teachers and supervisors. Now, if a comparison is to be made, it seems to us that this item needs to be further subdivided. It may be that one city is paying entirely too much for supervision. We may want to discover if there is any relation between a large amount of money spent for supervision and the amount spent for school supplies. In order to discover these things, it will be necessary for us to subdivide the item of “salaries.”

Again, in order that we may be able to make a valid comparison, it has seemed wise to divide the salaries for teaching into several items, namely: the amount paid elementary school teachers; high school teachers; kindergarten, evening school, truant school, and teachers' training school teachers; special teachers, or supervisors of special subjects; and teachers in vacation schools and play grounds. As stated above, we can only compare the item of salaries when we know in what way that money was spent.

In the report of the National Educational Association Committee, supplies are classified under two heads—stationery and

other supplies for schools. We have thought it best to classify all supplies consumed by pupils under a single head, including in this item paper, pencils, ink, chalk, pens, pen-holders, black-board erasers, laboratory, manual training, cooking, and kindergarten supplies, etc. In order that we may be able to use this item and that of text-books intelligently, our form contains the following questions: Are text-books furnished free to indigents? Are they furnished free to all pupils? What supplies are furnished free to indigents? to all students?

Other supplies are classified under two heads: janitors' supplies and supplies for the board of education, superintendents', and principals' offices. Besides the item of janitors' salaries, we include, as a separate item, salaries of matrons or maids in connection with the kindergartens or baths.

In addition to the item of fuel and light (which we classify under two heads, namely, fuel, and light and power) and ordinary repairs to buildings given in the National Educational Association Report, we have seen fit to classify current expenses under the following additional heads: water; rent; school census; transportation of pupils; insurance; freight and expressage; printing and advertising; telephone, telegraph, postage, etc.; and other current expenses. We did not expect that all would report expenditures under each of the above heads, but we do think that if there are such expenses it is best that they be reported separately.

Our second large heading we have designated as "plant and permanent equipment." Under this head we make four subdivisions, namely: (1) new buildings and sites, furniture and furnishings for new buildings, and permanent improvements to buildings and grounds; (2) furniture exclusive of that put in new buildings; (3) permanent equipment or apparatus, including scientific apparatus, tools and apparatus for manual training and cooking, typewriters for commercial departments, maps, charts, globes, etc.; (4) reference and library books.

In asking for the amount paid on principal of bonded debt, on principal of loans, for interest, the total current expenses for evening schools, and for teachers' training schools, we have followed the recommendation of the National Educational Association Committee.

In another part of the report, we ask for the wages of car-

penters, bricklayers, and day laborers in the city from which information is received, hoping in this case to be able to infer something concerning the cost of living in that city, which will in turn enable us to form a correct idea concerning the salaries paid to teachers.

Of the fifty-eight cities reporting the first year, thirty were able to report their total expenditure under the classification given, without resorting to the use of the ambiguous heading "miscellaneous." Of the remaining twenty-eight cities, sixteen reported less than 2 % under the head "miscellaneous"; ten others reported less than 5 %; and the remaining cities reported 5.14 % and 6.75 % for unclassified expenditures. For the second year, of the thirty cities reporting, eighteen report nothing under "miscellaneous"; and of the remaining twelve, eight report 1 % or less, three 2 %, and one 3.76 % under this head.

In order to compare the expenditures in the different cities with but two years' data, it seemed best to base all comparisons upon the cost of maintenance and operation, that is, the expenditures which are absolutely necessary in order to keep the schools going, together with the amount spent for keeping the plant in proper repair. Under this head we included furniture put into old buildings, that is, new furniture put in to replace old; and also money spent for apparatus and for reference and library books. These expenditures, we believe, are properly classified as expenditures for maintenance and operation, since they seldom represent any very large increase in permanent equipment. In the printed form given above, they were placed under "plant and permanent equipment," because the writer believed that it was customary to place them there and that proper returns could be most easily secured by classifying them in this way. To have taken into consideration the amount spent for new buildings or grounds, or for permanent improvements, would have been unfair to some cities, because in some cases a much larger proportion of such expenditures is met by an issue of bonds than in others. The item of interest is not included in the cost of maintenance and operation for a similar reason. This item is sometimes included in the public school budget, while in other cases it is paid by the city. On this point the National Educational Association Committee on Uniform Financial Reports says:

"Expenditures seem to fall into three classes: the usual

current expenditures necessary for the maintenance of schools; expenditures for sites, buildings, permanent improvements and equipment; other expenditures which, for various reasons, are not put in either of the two preceding classes.

"For the purpose of this report the first of these classes is by far the most important, for it would probably be conceded that from this item of current expense should be determined the cost of education per child, the most important item to be shown."¹

After having determined the classification to be used, and that the total expenditures for maintenance and operation should serve as the basis for comparison, the question which next arises is, "How shall the separate items be compared as among the different cities?" It has been common to compare the expenditures for different cities on the basis of the cost per pupil in daily attendance. We shall use this method, and, in addition, it seems well to compare the different items on a slightly different basis, namely, the cost per pupil based upon a figure half-way between the average daily attendance and the average daily enrolment. In discussing this point, the National Educational Association Committee on Uniform Financial Reports says:

"For many reasons No. 39" (average number in daily membership, all schools) "seems the most suitable divisor. If computed in a uniform manner, the figures showing number in average daily membership would most nearly show the requirements for school rooms, furniture, supplies, and teachers. But it is not true that these figures are obtained by the same process, or based upon the same facts, in the different school systems. Usage varies so in computing membership in different schools—pupils in some cases being counted as members of the schools, when in other cities the same state of facts would cause the child to be considered as no longer a member of the school—that fair comparison is apparently not practicable by the use of this divisor.

"Your committee is of the opinion that a divisor as little subject to misunderstanding as possible, and one based upon facts which are obtained in the same way everywhere, is of the first importance. The members believe that this is provided by item 40, average number in daily attendance, all schools,

¹ *Report of the National Educational Association, 1899, p. 347.*

and we have, therefore, made that item the divisor to be used, in connection with items 12 and 13, to obtain what shall be known as the 'cost of education.'"¹

The school must provide teachers, buildings, and equipment for more than the average daily attendance, and yet it is seldom that provision is made for a number equal to the average daily enrolment. It seems, therefore, that the figure half-way between the two is a better figure than either of the others. It was impossible to secure the figures for the average daily enrolment in some cases, and for this reason the average cost per pupil for the first and second year will be based upon the average daily attendance, even though we do not believe it is so good a figure as the other.

Still another basis for comparison recommends itself—the apportionment of money spent for specific purposes expressed in per cents of the total expenditures for maintenance and operation. This last classification offers a particularly interesting basis for comparison and is entirely free from obscurity. The question is simply one of distribution of the money that is spent among the several items of the budget. Just as an individual may spend too much for clothes, for food, for books, or for amusement, in the same manner it is possible for a city to spend too great a proportion of its money for janitors, for fuel, for school supplies, or even for supervision.

The information which has been collected is given in the tables which follow. Throughout the study each city is known by the number which is given it in the first table.

These tables (Tables I to IX) contain every fact with which we work. Any one can, from the data here given, repeat all our calculations. Moreover, it may happen that some one else may wish to use the information which furnishes the basis of this study for a different purpose. It is unfortunate that many studies, involving the use of data which were secured with considerable difficulty, have been published without giving the data upon which the conclusions were based. Such an omission makes it impossible for any one else to verify the conclusions which the author has reached, and denies to others the use of valuable data which they might use for purposes quite as important as those for which the information was first collected.

¹ *Report of the National Educational Association, 1899*, pp. 349-352.

TABLE I

Gross expenditures for maintenance and operation for the school year 1902-03. Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.
1.	76,252	47,712	2,200	392	5,033	300	3,919	2,531	664	83	3,473	359
2.	60,492	38,015	2,000	150		350	2,690	662	300		10,163	286
3.	52,708	35,918	2,100		3,725			3,235	530		2,481	2,399
4.	153,729	98,028	16,570	550	10,950	400	5,194	4,449	1,078		7,357	353
5.	121,400	89,100	2,700	650	8,000	950		7,300	200	300	7,400	600
6.	50,613	36,860	2,100		2,660			3,315	100	50	2,079	130
7.	85,975	57,320	7,600	500	9,113	810	2,401	3,596	816		3,560	
8.	60,473	35,150	8,200		8,675	750	3,000	900	100	200	3,528	100
9.	100,484	66,883	2,800	1,080	7,520	500		6,749			9,414	
10.	217,991	160,832	3,683	1,482	12,886	1,000	5,011	7,052	583	913	9,285	572
11.	82,100	40,800	9,490	900	7,500	900		5,500			5,000	500
12.	71,281	45,775	6,500		5,402	168	2,075	2,660			5,000	
13.	95,802	51,578	16,660	614	6,587	900	2,493	2,706	234		6,309	179
14.	39,960	24,828	2,000		2,717	100	1,243	993	109		3,271	200
15.	116,039	82,062	2,500	550	7,019	200	4,607	4,607	310		7,801	314
16.	25,639	17,290	2,000		1,641	350	742	849			1,297	
17.	99,717	62,645	7,800	600	7,000	400	2,901	3,061		30	7,320	815
18.	43,570	30,700	1,950		2,960	100		3,300			2,800	
19.	52,870	33,250	1,800	350	3,600	70	2,500	1,500			3,800	
20.	59,772	42,730	1,275		3,080	400	1,422	929	95		5,896	78
21.	52,178	36,080	6,575	100	3,070	100		800	200	100	2,000	100
22.	17,368	12,856		205	727			1,018	259	37	714	60
23.	45,745	13,150	13,450	300	6,839	300					4,531	
24.	29,787	19,296	2,750	450	1,861		200	422	30	30	2,000	136
25.	30,398	21,250	2,400		1,500		100	100	30	50	2,000	35
26.	95,064	53,487	15,920	550	5,580	100	1,922	2,899	123	91	4,220	143
27.	40,622	22,812	4,250		2,951		2,473	725			1,899	
28.	46,041	30,001	1,800	590	3,328	300		1,732			3,474	
29.	56,374	34,745	1,640		3,944	175		3,847	640		2,870	20

City School Expenditures

19

TABLE I (Continued)

Gross expenditures for maintenance and operation for the school year 1902-03. Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Water.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.	Evening Schools (included in items already given).
1.		4,018	15	528	1,570		337	245	53	220	1,248	308	1,008	35	1,503
2.	141	3,249	100	100	1,800					35		300	150		1,821
3.		2,044										275			839
4.	581	5,087	264	100			237	180	50	449		546	1,306		1,556
5.		1,200		400	1,260					40		400	600	300	3,200
6.		2,000			750		94	79	25	20			350		762
7.		6,356		100	2,000	833	140	492	43	12		283			
8.	200	2,278		100	1,088	369	75	150	50	60		250	150	100	760
9.	550	150		150						86	4,602				794
10.	1,144	11,542		250	974			528		44					
11.	3,500	400		750	750	100	110	10	150		5,540	200			1,800
12.		2,500	163	98	690		100			150					1,153
13.	520	2,496	140	100	455	1,560	158	156	35	5	1,211	451	204	48	874
14.		2,811	48	36	646		134	76			239	298	140	70	
15.		3,173	800	125	997		159	260	33	37		100	325		
16.	300	1,030		50	89										635
17.		3,974		85	1,000		190	333	40	75	225	332	690	200	1,924
18.		1,200		60	300		50	100	25	25					
19.	200	3,000		125	1,500		90	100	15	20		300	650		
20.	531	2,192	225		190			138		32	557				522
21.	80	2,000				305	50	30	20	18		400		150	250
22.		1,148	22	33			25	108	5					150	1,698
23.	280	3,216	213	120	1,440				15		675	276	940		
24.	277	873		54		618		91	15	49	377			250	
25.	250	1,800		75		250	10	250	10	138				50	100
26.	523	3,254	556	281	100	1,280	76	300	50	43			500	3,065	808
27.	181	957		818	155		50	116				369	669	412	
28.	2,092			216	194					76	1,350	355		532	1,690
29.	158		6,008	126	696		266	220					669	350	

TABLE I (Continued)

Gross expenditures for maintenance and operation for the school year 1902-03. Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.
30.	110,846	74,946	3,000	800	7,013	1,000	1,892	3,087	765		5,481	206
31.	70,593	39,850	2,000	700	4,650	800	3,957				8,826	225
32.	80,361	44,437	3,000	700	4,500	400	852	1,500	301	1,500	5,249	592
33.	21,515	14,525	2,750	300	1,320	78	149		38	25	1,072	35
34.	49,993	32,176	2,160	600	4,060	780	25	458	300	200	5,025	108
35.	104,414	76,142	2,100	717	6,811	750	90		411	260	5,916	282
36.	38,677	22,809	6,700	300	1,340	120	250	80	20	2,000	271	
37.	50,462	29,874	8,502	1,017	2,656	250	1,043			3,024		
38.	24,278	15,686	1,800		934	400	50	100	155	50	1,336	
39.	51,887	32,305	5,750	500	2,700	400	909	400			3,416	
40.	54,614	34,362	2,225	694	2,172	450	945	2,282	177		4,804	
41.	87,209	56,574	3,662	1,626	4,004	84	4,952	126	20	5,294	418	
42.	89,467	48,525	13,900	1,000	4,684	1,000	4,500	3,500	500	5,000		
43.	62,348	40,642	2,200	397	4,143	500	1,166	1,053	431	67	5,520	236
44.	48,410	30,852	2,200	300	2,930	420	569		61	750	4,844	234
45.	88,459	59,334	2,000	150	4,730	600	4,815	1,071	250	150	3,343	806
46.	107,537	66,153	12,200	800	4,930	540	3,076	1,854	1,008	500	4,229	128
47.	58,427	16,294	9,500	2,108	4,931	500	1,950	1,620			9,411	347
48.	18,402	10,745	1,800	200	1,100	244	787	250	40	30	1,131	41
49.	14,877	9,512	1,800	100	600	200	771	150	100	52	814	
50.	81,954	51,099	5,700	1,400	2,775	500	3,685	1,303	150		5,128	214
51.	64,465	42,350	8,950	650	3,525	425	1,200	300	150	50	3,600	70
52.	100,305	52,500	6,625	725	7,000	600	3,000	3,500	625	450	4,500	
53.	144,783	96,925	17,700	1,000	9,990		7,057		1,397		4,034	
54.	75,700	42,225	8,100	950	4,200		2,900	3,450	600	250	3,750	800
55.	35,800	22,000	1,200	200	1,900	400	2,000				2,000	200
56.	50,192	27,415	8,175	400	4,200	150	800	929	600	844	2,195	203
57.	114,800	74,375	11,400	2,150	5,425		3,000	5,000	250	250	4,500	500
58.	77,200	48,650	7,455	500	4,180		5,000	1,000	500		2,500	200

City School Expenditures

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TABLE I (Continued)

Gross expenditures for maintenance and operation for the school year 1902-03, twenty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Water.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.	Evening Schools (included in items already given).
	8,157		75			931	660		351		1,021	201	1,261	675
	4,522	250	270		194		370		96	2,551	886		446	2,047
	8,541		300		424	151	644		240	3,014	2,000	500	1,516	
	1,011		62		50	9	55	21		15				
	730		266	250	730		615		96	239	850	325		
	2,915		185		370	75	678	80	249	4,202	590	696	903	
218	877		125		400	75	25	25	100		494	230	326	
	1,179				100		291			1,646			878	
	2,386		50		279	25	148	21			50	189	300	
	2,200				98		949		60	319			2,200	
396	1,909		72		799	47	1,102			703	283		1,190	
763	156	1,585	201	91	616	193	229	138	194	100	523		1,277	
1,000	2,500				1,006	75	260	50	150		1,000	500	317	
369	1,546	100	259	171	31	25	310	52	39	1,734	417	528	407	
393	2,079	1,116			595	94	130	30			284	335	194	
	6,139				982	108	780		100	1,452	395	150	443	
360	2,787	3,870		277		197	571	108	485	108	1,500	600	656	619
120	7,706	382			1,048		662	188		1,196	100	364	844	
96	275	450	50		84	30	291	10		591	68	41	50	
27	198		35		87	26	17	6		41	135	133	73	
	5,642	1,000	318		193	50	508	150	10		1,729		369	
	1,200		50		595	35	125	25	90		75	500	500	
	15,000				1,200	700	800	100	1,800			1,000	180	
	4,681										1,999			2,495
	3,175			350	600	275	350	50	275	915	350	1,675	280	1,950
	1,000									3,500	500	500	400	
	2,683				284		152		119	443	300	100	200	
	5,000				250	250	300	150			1,000	500	500	650
350	4,000	850			100	5	100	10	200			100	1,500	

TABLE II

Gross expenditures for maintenance and operation for the school year 1903-04, thirty of the cities which reported for 1902-03 reporting. The amounts are scored in dollars

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.
5.	124,160	90,100	2,700	640	8,400	920	3,500	1,200	200	200	10,000	800
6.	44,648	26,957	2,100		2,970	50	1,000	2,000	150		3,500	175
8.	63,749	44,554	2,100		3,675	750	3,000	600	100	100	3,500	
13.	114,634	70,099	15,455	500	6,518	1,000	2,663	3,434			7,548	
14.	41,793	26,935	2,000		3,306	101	1,043	1,319	47		3,565	
15.	116,108	70,129	18,020	675	7,390	200	2,490	3,928	168	98	6,783	229
16.	26,918	18,381	2,000		1,819	200	442	897			1,899	
20.	59,423	43,106	1,800		3,256	400	2,000	1,181	123		5,011	61
27.	40,637	22,598	5,686		3,217		2518				902	74
28.	47,036	31,195	1,800	570	3,328	300	1395				6,303*	
29.	50,616	32,349	1,547	250	4,263	146		4,037			3,067	45
30.	117,263	78,771	3,000	850	7,342	1,100	1,978	3,263			5,055	188
31.	77,025	50,751	2,000	700	5,075	800	536				7,766	113
32.	68,924	38,100	11,300	750	5,000	400	1,100	800	500	348	4,150	541
34.	45,412	29,105	2,000	600	4,857	780	52		663	1,070	1,639	
35.	123,116	89,360	6,775		5,870	810	100	500	407	300	7,808	149
36.	38,904	26,070	6,500	300	1,424	200		250	75	20	2,500	192
37.	53,161	31,107	9,283	1,121	2,790	250		664	100		4,198	24
39.	46,859	29,000	5,950	480	2,580	400		1,454	626	1,113	3065	
40.	54,556	27,563	9,850	1,200	1,980	450	1,475	2,080	274		3248	
41.	90,956	51,597	12,830	1,637	4,123	68	5,035		280	191	6,684	282
42.	92,550	50,050	14,600		4,784	1,000	4,690	3,803	606	1,051	4,400	221
43.	71,995	51,961	2,200	491	4,527	500	1,500	653	585	100	2,210	239
45.	91,573	61,140	5,800	1,200	5,255	600	3,573	1,500	500	400	3,709	900
48.	23,806	13,454	3,425	250	1,290	300	854	830	30	200	1,215	25
52.	106,235	63,885	5,950	2,300	8,400	1,000	4,200	3,500	500	350	4,000	1,000
54.	70,496	36,716	8,450	600	3,736		5,450	7,275	150		4,086	
55.	32,000	21,525	2,000	200	1,900		1,800	150	50		1,500	400
56.	49,888	33,525	2,200	400	4,150	100	900	1,200	500	100	2,195	203
57.	120,163	77,915	11,500	2,150	6,725		3,000		4,375		4,750	800

* Including repairs.

TABLE II (Continued)

Gross expenditures for maintenance and operation for the school year 1903-04, thirty of the cities which reported for 1902-03 reporting. The amounts are scored in dollars.

Number of City.	Water.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.	Evening Schools (included in items already given).
5.		1,200		400	1,400		125	150	75	50	1,300	200	500	100	2,300
6.		4,000		75	750	450	116	75	50	30			200		852
8.	180	2,200		100	1,211	500	50	200	75			205	50	600	400
13.	600	2,733	117		360	939						168	2,500		756
14.		1,972	130	39	675	193	173	111	24	18	110	30			
15.		3,287	800	125	893		100	354	36	35			267	100	
16.	300	786		50	144										612
20.		1,415			158			185		345	692				628
27.	182	1,500	500			526				17		1,494	645	330	131
28.		6,303		198							1,228		718		2,733
29.	176	2,592		125	788		184	211	434				400		
30.		10,822		75				985		355		427	1,995	1,057	
31.		7,025		290		543		214		99		447		667	1,277
32.		2,500		240		850	201	251		240		600	800	250	
34.		2,326			250	1,500	25			96		50	200	200	
35.		6,069				795	50	300	100	240		1,273	1,566	744	800
36.	210	50	60			168	60	75	15	100		410	75	150	
37.		2,415				504		379				100		225	
39.		1,871				209				60					
40.	403	2,051				50		1,318		60	2,036	518			
41.	568	3,252	200			182	139	367	59	26		2,280	572	585	
42.	604	3,120				751	99	213	110			1,068	750	630	
43.	559	2,095	100			730	50	437	100	141	1,705	552	277	384	
45.		4,634				350	200	762		100	438	388	175	350	
48.	40	920	30			100		540	40	60			100	103	
52.		5,000				2,500	650	700	100			1,000	1,000	200	
54.		2,000			350	443	50	100	25	200			614	256	
55.		400				100	10	100	10	75	790	600		500	
56.		1,800				283	200	152	50	119	310	1,000	200	300	1,000
57.		5,000	900			250	500	200	100		500	900	400	200	750

TABLE III

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902-03.

Number of City.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.	Repairs.
1.	62.6	2.9	.5	6.6	.4	5.1	3.3	.9	.1	4.6	.5		5.3
2.	63.1	3.3	.3		.6	4.5	1.1	.5		16.8	.5	.2	5.4
3.	68.2	4.0		7.1			6.1	1.0		4.7	4.6		3.9
4.	63.7	10.7	.4	7.1	.3	3.4	2.9	.7		4.8	.2	.4	3.3
5.	73.7	2.2	.5	6.6	.8		6.0	.2	.3	6.1	.5		1.0
6.	72.9	4.2		5.3			6.6	.2	.1	4.1	.3		4.0
7.	59.8	7.9	.5	9.5	.8	2.5	3.7	.8		3.7			6.6
8.	58.1	13.6		6.1	1.2	5.0	1.5	.2	.3	5.8	.2	.3	3.8
9.	66.9	2.8	1.1	7.5	.5		6.7			9.4		.5	.1
10.	73.8	1.7	.7	5.9	.5	2.3	3.2	.2	.4	4.3	.3	.5	5.3
11.	49.7	11.6	1.0	9.1	1.0		6.7			6.1	.6		4.3
12.	64.2	9.1		7.6	.2	3.5		3.7		7.0			3.5
13.	53.9	17.4	.6	6.9	.9	2.6	2.8	.2		6.6	.2	.5	2.6
14.	62.5	5.0		6.8	.3	3.1	2.5	.3		8.2	.5		7.1
15.	71.2	2.2	.5	6.2	.2	4.0	4.0	.3		6.7	.2		2.7
16.	67.5	7.8		6.4	1.4	2.9	3.3			5.1		1.2	4.0
17.	62.8	7.8	.6	7.0	.4	2.9	3.1			7.3	.8		4.0
18.	70.4	4.5		6.8	.2			7.6		6.4			2.7
19.	62.9	3.4	.7	6.8	.1	4.7	2.8			7.2		.4	5.7
20.	71.5	2.1		5.2	.7	2.4	1.2	.2		9.9	.1	.9	3.7
21.	69.1	12.6	.2	5.9	.2		1.5	.4	.2	3.8	.2	.2	3.8
22.	73.9	1.2		4.2			5.9	1.5	.2	4.1	.4		6.6
23.	28.8	29.4	.7	14.9	.7					9.9		.6	7.0
24.	64.7	9.2	1.5	6.3		.7	1.4	.1	.1	6.7	.5	.9	2.9
25.	69.9	7.9		4.9		.3	.3	.1	.2	6.6	.1	.8	5.9
26.	56.2	16.7	.6	5.9	.1	2.0	3.1	.1	.1	4.4	.2	.5	3.4
27.	56.2	10.4	1.1	7.9		6.1	1.8			4.7		.4	2.3
28.	65.2	3.9	1.3	7.2	.7		3.8			7.5		4.6	
29.	61.6	2.9		7.0	.3		6.8	1.1		5.1	.1	.3	

TABLE III (Continued)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902-03.

Number of City.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
1.		.1	2.1		.4	.3	.1	.3	1.6	.4	1.5	.1
2.	.2	.2	3.0					.1		.5	.3	
3.										.5		
4.	.2	.1			.2	.1		.3		.3	.8	
5.		.3	1.1							.3	.5	.3
6.		.2	1.5		.2	.2	.1				.7	
7.		.1	2.1	.9	.1	.5	.1			.3		
8.		.2	1.8	.6	.1	.3	.1	.1		.4	.3	.2
9.		.1						.1	4.6			
10.		.1	.5			.2						
11.	.5		.9	.9	.1	.1		.2	6.8	.2		
12.	.2	.1	1.0		.1			.2				
13.	.2	.1	.5	1.6	.2	.2	.1		.8	.5		.1
14.	.1	.1	1.7		.3	.2			.6	.7	.4	.2
15.	.7	.1	.9		.1	.2				.1	.3	.1
16.		.2	.4									
17.		.1	1.0		.2	.3		.1	.2	.3	.7	.2
18.		.1	.7		.1	.2	.1	.1				
19.		.2	2.8		.2	.2				.6	1.2	
20.	.4		.3			.2		.1	.9			
21.				.6	.1	.1				.7		.3
22.	.1	.2			.1	.6					.9	
23.		.5	.3	3.2						1.5	.6	2.1
24.		.2		2.1		.3	.1	.2	1.3		.8	
25.		.3		.8		.8		.5			.2	.3
26.	.6	.3	.1	1.4	1	.3	.1				.5	3.2
27.	2.0	.4		.1		.3			4.4	.9	1.7	1.0
28.	.5	.4						.2	2.9	.8	1.2	
29.	10.8	.2	1.2		.5	.4					1.2	.6

TABLE III (Continued)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902-03.

Number of City.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.	Repairs.
30.	68.4	2.7	.7	6.3	.9	1.7	2.8	.7		4.9	.1		7.4
31.	56.5	2.8	1.0	6.6	1.1		5.6			12.5	.3		6.4
32.	55.3	3.7	.9	5.6	.5	1.1	1.9	.4	1.9	6.5	.7		10.6
33.	67.5	12.8	1.4	6.1	.3		.7	.2	.1	4.9	.1		4.7
34.	64.5	4.3	1.2	8.1	1.6	.1	.9	.6	.4	10.0	.2		1.5
35.	73.2	2.0	.7	6.6	.7	.1		.4	.3	5.7	.2		2.8
36.	59.0	17.4	.8	3.5	.3		.6	.2	.1	5.2	.7	.6	2.3
37.	59.2	16.9	2.0	5.3	.5			2.1		6.0			2.3
38.	64.5	7.4		3.8	1.7	.2	.4	.6	.2	5.5			9.8
39.	62.3	11.1	1.0	5.2	.8		1.8	.8		6.6			4.2
40.	63.2	4.0	1.3	3.9	.8	1.7	4.1	.3		8.7		.7	3.5
41.	64.9	4.2	1.9	4.6	.1		5.7	.1		6.1	.5	.9	.2
42.	54.2	15.5	1.1	5.2	1.1	5.0	3.9	.6		5.6		1.1	2.8
43.	65.3	3.5	.6	6.7	.8	1.9	1.7	.7	.1	8.9	.4	.6	2.5
44.	63.8	4.6	.6	6.1	.9	1.2		.1	1.5	10.0	.5	.8	4.3
45.	67.1	2.3	.2	5.3	.7	5.4	1.2	.3	.2	3.8	.9		6.9
46.	61.3	11.3	.7	4.6	.5	2.9	1.7	.9	.5	3.9	.2	.3	2.6
47.	27.9	16.3	3.6	8.4	.9	3.3		2.8		16.1	.6	.2	13.2
48.	58.4	9.8	1.1	6.0	1.3	4.3	1.4	.2	.2	6.2	.2	.5	1.5
49.	63.9	12.1	.7	4.0	1.3	5.2	1.0	.7	.4	5.5		.2	1.3
50.	62.9	7.0	1.7	3.4	.6	4.5	1.6	.2		6.3	.3		6.9
51.	65.7	13.9	1.0	5.5	.7	1.9	.5	.2	.1	5.6	.1		1.9
52.	52.3	6.6	.7	7.0	.6	3.0	3.5	.6	.4		4.4		15.0
53.	66.9	11.8	.7	6.9			4.9		1.0		2.8		3.2
54.	56.0	10.7	1.3	5.6		3.8	4.6	.8	.3	5.0	1.1		4.2
55.	61.5	3.4	.6	5.3	1.1	5.6				5.6	.6		2.8
56.	54.6	16.3	.8	8.4	.3	1.6	1.8	1.2	1.7	4.4	.4		5.3
57.	64.7	9.9	1.9	4.7		2.6	4.4	.2	2.0	3.9	.4		4.4
58.	63.1	9.7	.7	5.4	1.0		6.5	1.3	.7	3.2	.3	.5	5.2

TABLE III (Continued)

The amounts spent for each item expressed as per cents of the total amount spent or maintenance and operation. Fifty-eight cities, for the school year 1902-03.

Number of City.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
30.					.8	.6		.3		.9	.2	1.1
31.	.4	.4		.3		.5		.1	3.6	1.3		.6
32.		.4		.5	.2	.8		.3	3.7	2.5	.6	1.9
33.		.3		.2	.1	.3	.1		.1			
34.		.5	.5	1.5		1.2		.2	.5	1.7	.7	
35.		.2		.4	.1	.7	.1	.2	4.0	.6	.7	.9
36.		.3		1.0	.2	.1	.1	.3	4.9	1.3	.6	.8
37.				.2		.6			3.3		1.7	
38.		.2		1.2	.1	.6	.1		1.3	.2	.8	1.2
39.				.2		1.8		.1				4.2
40.		.1		1.5	.1	2.0			1.3	.5	2.2	
41.	1.8	.2	.1	.7	.2	.3	.2	.2	5.1	.6	1.5	
42.				1.1	.1	.3	.1	.2		1.1	.6	.4
43.	.2	.4	.3	.1	.1	.5	.1	.1	2.8	.7	.9	.7
44.	2.3			1.2	.2	.3	.1			.6	.7	.4
45.				1.1	.1	.9		.1	1.6	.4	.2	.5
46.	3.6		.3		.2	.5	.1	.5	.1	1.4	.2	.6
47.	.7			1.8		1.1		.3		2.0	.2	.6
48.	2.5	.3		.5	.2	1.6	.1		3.2	.4	.2	.3
49.		.2		.6	.2	.1	.1		.3	.9	.9	.5
50.	1.2	.4	.2	.1	.6	.2				2.1		
51.		.1		.9	.1	.2	.1	.1		.1	.8	.8
52.				1.2	.7	.8			1.8		1.0	.2
53.										1.4		
54.			.5	.8	.4	.5	.1	.4	1.2	.5	2.2	.4
55.									9.8	1.4	1.4	1.1
56.						.3		.2	.9	.6	.2	.4
57.				.2	.2	.3	.1			.8	.3	.4
58.						.1		.3			.1	1.9

TABLE IV

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Thirty cities, for the school year 1903-04.

Number of City.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
5.	72.7	2.2	.5	6.8	.7	2.8	1.0	.2	.2	8.1	.6	
6.	60.5	4.7		6.7		2.2	4.5	.3		7.8	.4	
8.	70.0	3.3		5.8	1.2	4.7	.9	.1	.2	5.5		.3
13.	60.9	13.4	.4	5.7	.9	2.3	3.0			6.6		.5
14.	64.4	4.8		7.9	.2	2.5	3.2	.1			8.5	
15.	60.5	15.6	.6	6.4	.2	2.1	3.4	.1	.1	5.8	.2	
16.	68.3	7.4		6.8	.7	1.6	3.3			7.1		1.1
20.	73.0	3.0		5.5	.7	3.4	2.0	.2		7.4	.1	
27.	55.6	14.0	1.1	7.9			6.2			2.2	.2	.4
28.	66.4	3.8	1.2	7.1	.6		3.0				13.4	
29.	63.9	3.1	.5	8.4	.3		8.0			6.1	.1	.3
30.	67.3	2.6	.7	6.3	.9	1.7		2.8		4.3	.2	
31.	65.9	2.6	.9	6.6	1.0	.7				10.1	.1	
32.	55.3	6.4	1.1	7.3	.6	1.6	1.2	.7	.5	6.0	.8	
34.	64.0	4.4	1.3	10.7	1.7	.1		1.5	2.4	3.6		
35.	72.6	5.5		4.8	.6	.1	.4	.3	.2	6.3	.1	
36.	68.2	17.1	.8	3.7	.5		.6	.2	.1	6.5	.5	.5
37.	58.8	17.6	2.1	5.3	.5		1.3	.2		7.9	.1	
39.	62.0	12.7	1.0	5.5	.8		3.1	1.3	2.4	6.5		
40.	50.9	18.2	2.2	3.7	.8	2.7		.5	3.8	6.0		.7
41.	56.8	14.1	1.8	4.5	.1		5.5	.3	.2	7.3	.3	.6
42.	54.1	16.0		5.2	1.1	5.1	4.1	.6	1.1	4.8	.2	.6
43.	72.2	3.1	.7	6.3	.7	2.1	.9	.8	.1	3.1	.3	.8
45.	66.8	6.3	1.3	5.7	.7	3.9	1.6	.5	.4	4.0	1.0	
48.	56.5	14.4	1.0	5.4	1.3	3.6	3.5	.1	.8	5.1	.1	.2
52.	60.2	5.6	2.2	7.9	.9	4.9	3.3	.5	.3	3.8	.9	
54.	52.1	12.0	.8	5.3		7.7	10.3	.2			5.8	
55.	67.3	6.2	.6	5.9		5.6	.5	.2		4.7	1.2	
56.	67.2	4.4	.8	8.3	.2	1.8	2.4	1.0	.2	4.4	.4	
57.	64.9	9.6	1.8	5.6		2.5		3.6		4.0	7	

TABLE IV (Continued)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Thirty cities, for the school year 1903-04.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
5.	1.0		.3	1.1		1.0	1.2	.1		1.0	.2	.4	.1
6.	9.0		.2	1.7	1.0	.3	.2	.1	.1			.4	
8.	3.4		.2	1.9	.8	.1	.3	.1			.3	.1	.9
13.	2.4	.1		.3	.8						.1	2.2	
14.	4.7	.3	.1	1.6	.5	.4	.2	.1	.1	.3	.1		
15.	2.8	.7	.1	.8		.1	.3				.2	.1	
16.	2.9		.2	.5			.3						
20.	2.4			.3					.1	1.2			
27.	4.9				1.3						3.7	1.6	.8
28.			.4							2.6		1.5	
29.	5.1		.2	1.6		.4	.4			.9		.8	
30.	9.3		.1						.3	.8	.4	1.7	.9
31.	9.1		.4		.7		.3		.1		.6		.9
32.	3.6		.3		1.2	.3	.4		.3		.9	1.2	.4
34.	5.1			.5	3.3	.1			.2		.1	4	.4
35.	4.9				.6		.2	.1	.2		1.0	1.3	.6
36.	.1	.2			.4	.2	.2		.3		1.1	.2	.4
37.	4.6				.9		.7				.2		.4
39.	4.0				.4				.1				
40.	3.8				.1		2.4		.1	3.8	1.0		
41.	3.6	.2			.2	.1	.4	.1			2.5	.6	.6
42.	3.4				.8	.1	.2	.1			1.1	.8	.7
43.	2.9	.1			1.0	.1	.6	.1	.2	2.4	.8	.4	.5
45.	5.1				.4	.2	.4		.1	.5	.4	.2	.4
48.	3.9		.1		.4		2.3	.2	.3			.4	.4
52.	4.7				2.4	.6	.7	.1	.1		.9	.9	.2
54.	2.8			.5	.6	.1	.1		.3			.9	.4
55.	1.3						.3		.2	2.5	1.9		1.6
56.	3.6				.6	.4	.3	.1	.2	.6	2.0	.4	.6
57.	4.2	.7			.2	.4	.2	.1		.4	.7	.3	.2

TABLE V

The average of the amounts spent for each item for two years expressed as per cents of the average total expenditure for two years. Thirty cities, for the school years 1902-03 and 1903-04.

Number of City.	Teaching and Supervision.	Supervision.	Janitors' Salaries.	Teaching.	Text-Books and Supplies.	Fuel	Repairs.
5.	75.4	2.2	6.7	73.2	5.2	7.1	.9
6.	71.0	4.4	6.0	66.7	6.6	6.0	6.5
8.	72.5	8.4	6.0	64.0	6.0	5.7	3.6
13.	72.8	15.4	6.3	59.4	5.3	6.6	2.5
14.	68.4	4.9	7.4	63.4	5.6	8.1	5.9
15.	74.7	8.9	6.3	65.8	6.7	6.2	2.8
16.	75.5	7.6	6.6	67.9	5.6	6.1	3.5
20.	74.6	2.6	5.3	72.2	4.4	8.6	3.0
27.	68.1	12.6	7.6	55.9	7.0	3.5	3.6
28.	69.7	3.9	7.1	65.8	3.4		
29.	65.7	3.0	7.7	62.8	6.9	5.6	2.1
30.	70.5	2.6	6.3	67.8		4.6	8.3
31.	64.0	2.7	6.6	61.2		11.2	7.8
32.	65.4	10.1	6.4	55.3	2.8	6.3	7.1
34.	68.6	4.4	9.4	64.2		6.8	3.3
35.	76.7	3.8	5.7	72.9	.3	5.9	3.8
36.	80.8	17.2	3.6	62.6	.7	5.8	1.2
37.	76.2	17.2	5.2	59.2		6.9	3.4
39.	73.9	11.9	5.4	62.1		6.5	4.1
40.	68.1	11.1	3.8	57.0	6.1	7.3	3.6
41.	70.0	9.1	4.5	60.9	5.6	6.7	1.8
42.	69.8	15.7	5.2	54.1	9.1	5.1	3.1
43.	72.0	3.3	6.4	68.7	3.3	5.9	2.7
45.	71.2	4.3	5.5	66.9	6.1	3.9	5.9
48.	68.5	12.1	5.7	57.4	6.3	5.6	2.7
52.	62.4	6.1	6.4	56.2	7.3	3.6	9.8
54.	65.4	11.3	5.4	54.0	13.2	4.8	3.5
55.	69.2	4.8	5.6	64.4	5.8	5.1	2.0
56.	71.2	10.3	8.3	60.9	3.8	4.4	4.4
57.	74.5	9.7	5.1	64.8		3.9	4.2

TABLE VI

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902-03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
1.	34.18	21.38	.99	.17	2.26	.14	1.75	1.13	.30	.03	1.56	.16	
2.	26.48	16.69	.88	.07		.15	1.17	.29	.13		4.39	.12	.06
3.	27.09	18.47	1.08		1.91			1.66	.27		1.27		
4.	30.91	19.73	3.33	.11	2.21	.08	1.05	.89	.22		1.48	.07	.12
5.	32.30	23.70	.72	.17	2.13	.25		1.94	.05	.08	1.97	.16	
6.	26.80	19.50	1.12		1.41			1.75	.05	.03	1.10	.07	
7.	21.19	12.65	1.68	.10	2.01	.18	.53	.79	.18		.78		
8.	29.80	17.29	4.04		1.81	.37	1.48	.44	.05	.10	1.74	.05	.10
9.	29.29	19.50	.82	.32	2.19	.15		1.96			2.75		.16
10.	41.21	30.40	.70	.28	2.44	.19	.95	1.34	.10	.17	1.75	.08	.22
11.	27.90	13.90	3.23	.31	2.56	.31		1.88			1.70	.17	
12.	28.28	18.12	2.58		2.14	.07	.82		1.06		1.99		
13.	28.53	15.33	4.96	.18	1.96	.27	.74	.81	.07		1.88	.05	1.6
14.	27.35	17.02	1.37		1.86	.07	.85	.68	.07		2.24	.14	
15.	24.33	17.20	.52	.12	1.47	.04	.97	.97	.06		1.64	.07	
16.	27.67	18.65	2.16		1.77	.38	.80	.92			1.40		
17.	34.88	21.90	2.73	.21	2.45	.14	1.02	1.07		.01	2.56	.28	
18.	34.59	24.39	1.55		2.35	.08		2.62			2.23		
19.	27.78	17.50	.95	.18	1.90	.04	1.32	.79			2.00		.11
20.	22.53	16.13	.48		1.16	.15	.54	.35	.04		2.23	.03	.20
28.	28.44	18.55	1.11	.36	2.05	.18		1.07			2.14		1.29
29.	27.91	17.20	.81		1.95	.09		1.91	.32		1.43	.01	.08

TABLE VI (Continued)

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902-03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
1.	1.80	.01	.24	.70		.15	.10	.02	.10	.56	.14	.45	.02
2.	1.42	.04	.04	.90					.01		.13	.07	
3.	1.05									1.23	.14		
4.	1.03	.05	.02			.05	.03	.01	.09		.10	.26	
5.	.32		.10	.34					.01		.10	.16	.08
6.	1.06			.40	.05	.04	.01	.01				.19	
7.	1.40		.02	.44	.18	.03	.09	.01			.06		
8.	1.12		.05	.54	.18	.04	.07	.02	.03		.12	.07	.05
9.	.04		.04						.02	1.34			
10.	2.18		.05	.18			.10		.01				
11.	1.19	.14		.26	.26	.03	.04		.05	1.89	.07		
12.	9.9	.06	.04	.27		.04			.06				
13.	.74	.04	.03	.14	.46	.05	.05	.01		.36	.13	.06	.01
14.	1.93	.03	.02	.44		.09	.05			.16	.20	.10	.05
15.	.67	.17	.03	.21		.03	.05	.01	.01		.02	.07	.01
16.	1.11		.05	.10									
17.	1.39		.03	.35		.07	.12	.01	.03	.08	.12	.24	.07
18.	.95	.05		.24		.04	.08	.02	.02				
19.	1.58		.06	.79		.05	.05	.01	.01		.16	.34	
20.	.83	.08		.07			.05		.01	.21			
28.	—	.13	.12						.05	.83	.22	.33	
29.		2.98	.06	.34	.13	.10						.33	.17

TABLE VI (Continued)

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902-03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
30.	35.41	23.92	.96	.26	2.24	.32	.61	.98	.24		1.75	.07	
31.	26.82	15.20	.76	.27	1.77	.03		1.50			3.36	.09	
32.	33.50	18.52	1.25	.29	1.88	.17	.36	.63	.13	.63	2.19	.25	
33.	24.13	16.31	3.08	.34	1.48	.09		.17	.04	.03	1.20	.04	
34.	35.20	22.65	1.52	.42	2.82	.55	.02	.32	.21	.14	3.54	.08	
35.	24.08	17.55	.48	.17	1.57	.17	.02		.09	.06	1.36	.06	
37.	18.55	10.96	3.13	.37	.98	.09			.38		1.11		
38.	22.68	14.65	1.69		.87	.37	.05	.09	.15	.05		1.25	
39.	30.87	19.24	3.42	.30	1.61	.24		.54	.24			2.03	
40.	33.61	21.08	1.36	.43	1.33	.28	.58	1.40	.11			2.95	.24
41.	23.77	15.41	1.00	.44	1.09	.02		1.35	.03	.01	1.44	.11	.21
42.	28.23	15.31	4.39	.32	1.48	.32	1.42	1.11	.16			1.58	.32
43.	25.14	16.39	.89	.16	1.67	.20	.47	.43	.17	.03	2.23	.09	.15
44.	25.50	16.22	1.16	.16	1.54	.22	.30		.03	.39	2.55	.12	.21
45.	27.14	18.20	.61	.05	1.45	.18	1.48	.33	.08	.05	1.03	.25	
46.	39.40	24.23	4.47	.29	1.81	.20	1.13	.68	.37	.18	1.55	.05	.13
47.	18.33	5.11	2.98	.66	1.55	.16	.61		.51		2.95	.11	.04
48.	21.09	12.28	2.06	.23	1.26	.28	.90	.29	.05	.04	1.29	.05	.11
49.	20.93	13.40	2.54	.14	.85	.28	1.09	.21	.14	.07	1.15		.04
51.	29.83	19.60	4.14	.30	1.63	.20	.56	.14	.07	.02	1.67	.03	
53.	29.61	19.82	3.62	.21	2.04			1.44		.29		.83	
54.	52.75	35.07	5.64	.67	2.92		2.02	2.40	.42	.17	2.61	.56	
55.	19.61	12.08	.66	.11	1.04	.22		1.09			1.09	.11	
56.	27.12	14.82	4.42	.22	2.28	.08	.43	.50	.32	.46	1.18	.11	
57.	51.49	33.36	5.11	.96	2.43		1.35	2.24	.11	.11	2.02	.22	
58.	20.38	12.83	1.97	.13	1.11			1.32	.26	.13	.66	.05	.09

TABLE VI (Continued)

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902-03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
30.	2.61		.02				.21		.11	.30	.33	.06	.40
31.	1.72	.17	.10		.07	.14	.14		.04	.97	.34	1.7	
32.	3.56		.13		.18	.27	.27		.10	1.26	.83	.21	.63
33.	1.13		.07		.06	.06	.06	.02		.02			
34.	.51		.19	.18	.51	.43	.43		.07	.17	.60	.23	
35.	.67		.04		.09	.16	.16	.02	.06	.97	.14	.16	.21
37.	.43				.04	.11	.11			.61		.32	
38.	2.23		.05		.26	.02	.14	.02		.30	.05	.18	.28
39.	1.31				.06		.56		.04			1.31	
40.	1.17		.04		.49	.03	.68			.43	.17	.73	
41.	.04	.43	.05	.02	.17	.05	.06	.04	.05	1.22	.14	.35	
42.	.79				.32	.02	.08	.02	.05		.32	.16	.10
43.	.62	.04	.10	.07	.01	.01	.12	.02	.01	.70	.17	.21	.16
44.	1.09	.59			.31	.05	.07	.01			.15	.18	.10
45.	1.88				.30	.03	.24		.03	.65	.12	.05	.13
46.	1.02	1.42		.10		.07	.21	.04	.18	.04	.55	.22	.24
47.	2.42	.12			.33		.21		.06		.37	.03	.11
48.	.31	.51	.06		.10	.03	.33	.01		.68	.08	.05	.06
49.	.28		.05		.12	.04	.02	.01		.06	.19	.19	.10
51.	.56		.02		.27	.02	.06	.01	.04		.03	.23	.23
53.	.96										.41		
54.	2.21			.24	.42	.19	.24	.03	.19	.64	.24	1.17	.19
55.	.55									1.92	.27	.27	.22
56.	1.45				.15		.08		.06	.24	.16	.05	.10
57.	2.24				.11	.11	.14	.07			.45	.22	.22
58.	1.06	.22			.03		.03		.05			.03	.40

TABLE VII

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902-03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
1.	35.64	22.30	1.03	.18	2.35	.14	1.83	1.18	.31	.04	1.63	.17	
2.	28.00	17.60	.93	.07		.16	1.24	.31	.14		4.70	.13	.07
3.	28.06	19.10	1.12		1.98			1.72	.28		1.32		
4.	31.90	20.35	3.44	.11	2.27	.08	1.08	.92	.22		1.53	.07	.12
5.	33.27	24.41	.74	.18	2.19	.26		1.99	.06	.08	2.03	.16	
6.	27.65	20.10	1.15		1.45			1.81	.05	.03	1.14	.07	
7.	21.61	12.91	1.71	.11	2.05	.18	.54	.81	.18		.80		
8.	31.16	18.10	4.23		1.89	.39	1.55	.46	.05	.10	1.82	.05	.10
9.	31.01	20.63	.86	.33	2.32	.15		2.08			2.91		.17
10.	43.23	31.91	.73	.29	2.56	.20	.99	1.39	.12	.18	1.84	.11	.23
11.	29.01	14.42	3.35	.32	2.65	.32		1.94			1.77	.18	
12.	29.20	18.75	2.66		2.21	.07	.85	1.09			2.05		
13.	29.56	15.90	5.14	.19	2.03	.28	.77	.83	.07		1.95	.05	.16
14.	28.75	17.89	1.44		1.95	.07	.89	.71	.08		2.50		
15.	25.35	17.91	.55	.12	1.53	.04	1.01	1.01	.07		1.71	.07	
16.	28.41	19.17	2.22		1.82	.39	.82	.94			1.44		.33
17.	36.00	22.60	2.82	.22	2.53	.14	1.05	1.11		.01	2.64	.29	
18.	35.70	25.17	1.60		2.43	.08		2.71			2.30		
19.	28.90	18.16	.98	.19	1.97	.04	1.37	.82			2.08		.11
20.	23.16	16.58	.49		1.19	.15	.55	.36	.04		2.29	.03	.21
21.	24.50	16.90	3.08	.05	1.44	.05		.38	.09	.05	.94	.05	.04
22.	8.94	6.63	.11		.37			.53	.13	.02	.37	.03	
23.	12.85	3.69	3.78	.08	1.92	.08					1.27		.08
24.	15.26	9.87	1.41	.23	.96		.10	.22	.01	.01	1.03	.07	.14
25.	31.00	21.67	2.45		1.53		.11	.11	.03	.05	2.04	.04	.25
26.	32.67	18.37	5.47	.19	1.92	.03	.66	.99	.04	.03	1.45	.05	.18
27.	26.96	15.11	2.82		1.95		1.64		.48		1.25		.12
28.	30.30	19.77	1.19	.39	2.19	.20		1.14			2.28		1.38
29.	29.50	18.21	.86		2.06	.09		2.01	.33		1.51	.01	.08

TABLE VII (Continued)

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities for the school year 1902-03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph Postage etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
1.	1.88	.01	.25	.73		.16	.11	.02	.10	.16	.56	.47	.02
2.	1.50	.05	.05	.83					.01		.14	.07	
3.	1.09									1.28	.15		
4.	1.06	.05	.02			.05	.04	.01	.09		.11	.27	
5.	.33		.11	.34					.01		.11	.16	.08
6.	1.09			.41		.05	.04	.01	.01			.19	
7.	1.43		.02	.45	.19	.03	.11	.01			.06		
8.	1.17		.05	.56	.19	.04	.08	.03	.03		.13	.08	.05
9.	.05		.05						.03	1.42			
10.	2.29		.05	.19			.10		.01				
11.	1.24	.14		.26	.26	.04	.04	.01	.05	1.96	.07		
12.	1.03	.07	.04	.28		.04			.06				
13.	.77	.04	.03	.14	.48	.05	.05	.01		.37	.14	.06	.01
14.	2.02	.03	.03	.46		.10	.05			.17	.21	.10	.05
15.	.69	.17	.03	.22		.03	.06	.01	.01		.02	.07	.01
16.	1.14		.05	.10									
17.	1.43		.03	.36		.07	.12	.01	.02	.08	.12	.25	.07
18.	.98		.05	.25		.04	.08	.02	.02				
19.	1.64		.07	.82		.05	.05	.01	.01		.16	.35	
20.	.85	.09		.07			.05		.01	.22			
21.	.94				.14	.02	.01	.01	.01		.19		.07
22.	.59	.01	.02			.01	.06					.08	
23.	.90		.06	.03	.40				.01		.19	.08	.26
24.	.45		.03		.32		.05	.01	.02	.19		.13	
25.	1.83		.08		.25	.01	.25	.01	.14			.05	.11
26.	1.12	.19	.10	.03	.44	.03	.10	.02	.01			.17	1.05
27.	.63	.54	.10		.03		.08			1.18	.24	.44	.27
28.		.14	.13						.05	.89	.23	.35	
29.		3.15	.07	.36		.14	.11					.35	.18

TABLE VII (Continued)

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902-03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
30.	37.32	25.25	1.01	.27	2.36	.34	.64	1.04	.26		1.85	.07	
31.	27.90	15.75	.79	.28	1.84	.32		1.56			3.49	.09	
32.	34.49	19.07	1.29	.30	1.93	.17	.37	.64	.13	.64	2.25	.25	
33.	24.85	16.78	3.18	.35	1.52	.09		.17	.04	.03	1.24	.04	
34.	35.96	23.15	1.56	.44	2.92	.56	.02	.33	.22	.09	3.61	.08	
35.	24.52	17.87	.49	.17	1.60	.18	.02		.10	.06	1.39	.07	
36.	31.94	18.88	5.54	.25	1.11	.10		.21	.07	.02	1.66	.22	.18
37.	19.26	11.40	3.25	.39	1.01	.09		.40			1.15		
38.	23.56	15.21	1.75		.91	.40	.05	.10	.15	.05	1.30		
39.	32.01	19.94	3.55	.31	1.67	.25		.56	.25			2.11	
40.	34.79	21.90	1.42	.44	1.38	.29	.60	1.45	.11		3.06	.25	
41.	24.65	15.99	1.03	.46	1.13	.02		1.40	.04	.01	1.49	.12	.22
42.	28.50	15.47	4.43	.32	1.49	.32	1.43	1.12	.16			1.59	.32
43.	26.09	17.00	.92	.17	1.73	.21	.49	.45	.18	.03	2.31	.10	.15
44.	26.18	16.69	1.19	.16	1.58	.23	.31		.03	.40	2.62	.13	.21
45.	28.53	19.14	.64	.05	1.53	.19	1.55	.35	.08	.05	1.08	.26	
46.	41.52	25.53	4.71	.31	1.91	.21	1.19	.72	.39	.19	1.63	.05	.14
47.	20.71	5.78	3.37	.75	1.75	.18	.69		.57		3.34	.12	.04
48.	22.75	13.29	2.23	.25	1.36	.30	.97	.31	.05	.04	1.39	.05	.12
49.	22.20	14.20	2.69	.15	.89	.30	1.15	.22	.15	.08	1.22		.04
51.	32.05	21.05	4.45	.32	1.76	.21	.59	.15	.15	.02	1.79	.04	
52.	26.39	13.81	1.75	.19	1.84	.16	.79	.92	.16	.12		1.19	
53.	30.61	20.49	3.74	.21	2.11			1.49		.29		.85	
54.	54.72	30.60	5.87	.69	3.05		2.11	2.50	.43	.18	2.72	.58	
55.	20.50	12.61	.69	.11	1.09	.23		1.14			1.14	.11	
56.	28.01	15.33	4.56	.22	2.35	.08	.45	.52	.33	.47	1.22	.11	
57.	51.25	33.20	5.09	.96	2.42		1.34	2.23	.11	.11	2.01	.22	
58.	21.51	13.55	2.08	.14	1.17			1.39	.28	.14	.69	.06	.10

TABLE VII (*Continued*)

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902-03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
30.	2.75		.02			.31	.22		.12		.34	.07	.42
31.	1.79	.10	.11		.08		.15		.04	1.01	.35		.18
32.	3.67		.13		.18	.06	.27		.10	1.29	.86	.21	.65
33.	1.17		.07		.06	.01	.06	.03		.02			
34.	.52		.19	.18	.52		.44		.07	.17	.61	.23	
35.	.68		.04		.09	.02	.16	.02	.06	.99	.14	.16	.21
36.	.72		10		.33	.06	.02	.02	.08	1.57	.41	.19	.27
37.	.45				.04		.11			.63			.33
38.	2.32		.05		.27	.02	.14	.02		.31	.05	.18	.29
39.	1.36				.06		.59		.04				1.36
40.	1.21		.05		.51	.03	.70			.45	.18		.76
41.	.04	.45	.06	.03	.17	.05	.06	.04	.05	1.27	.15		.36
42.	.80				.32	.02	.08	.02	.05		.32	.16	.10
43.	.65	.04	.11	.07	.01	.01	.13	.02	.01	.69	.17	.22	.17
44.	1.12	.60			.32	.05	.07	.01			.15	.18	.10
45.	1.98				.32	.04	.25		.03	.68	.13	.05	.14
46.	1.07	1.49		.11		.08	.22	.04	.19	.04	.58	.23	.25
47.	2.03	.14			.37		.23		.07		.42	.04	.13
48.	.34	.56	.06		.11	.04	.36	.01		.73	.08	.05	.06
49.	.29		.05		.13	.04	.03	.01		.06	.20	.20	.11
51.	.59		.02		.29	.02	.06	.01	.05		.03	.25	.25
52.	3.95				.31	.18	.21	.03		.47		.26	.05
53.	1.00										.42		
54.	2.30			.25	.43	.20	.25	.04	.20	.66	.25	1.21	.20
55.	.57									2.01	.29	.29	.23
56.	1.50				.16		.08		.07	.25	.17	.06	.11
57.	2.23				.11	.11	.13	.07			.45	.22	.22
58.	1.12	.24			.03		.03		.06			.03	.42

TABLE VIII

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Thirty of the cities which reported in 1902-03 reporting for the year 1903-04.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
5.	34.08	25.51	24.77	.74	2.31	1.29	2.75	.33
6.	24.26	15.80	14.66	1.14	1.61	1.63	1.91	2.18
8.	32.36	23.65	22.58	1.07	1.86	1.83	1.78	1.12
13.	34.21	25.52	20.91	4.61	1.94	1.82	2.25	.82
14.	28.79	19.96	18.58	1.38	2.28	1.63		1.36
15.	24.65	18.71	14.88	3.83	1.57	1.36	1.44	.69
16.	28.18	21.32	19.23	2.09	1.90	1.51	1.99	.82
20.	23.06	17.40	16.71	.69	1.26	1.21	1.94	.55
27.	26.25	18.23	14.57	3.67	2.07	1.62	.58	.97
28.	29.38	20.63	19.50	1.13	2.08	.87	3.94	
29.	24.72	15.54	15.78	.76	2.08	1.97	1.49	1.26
30.	38.70	26.99	26.00	.99	2.42		1.67	3.57
31.	30.92	21.17	20.37	.80	2.04		3.12	2.82
32.	28.00	20.11	15.52	4.59	2.04	.78	1.69	1.02
34.	31.54	21.62	20.23	1.39	3.37		1.13	1.61
35.	29.93	23.40	21.75	1.65	1.43	.14	1.90	1.47
36.	31.70	26.49	21.20	5.29	1.16		2.04	.04
37.	20.71	15.76	12.15	3.61	1.08		1.63	.94
39.	28.78	21.46	17.80	3.66	1.59			1.15
40.	31.14	21.35	15.72	5.63	1.14	2.03		1.17
41.	25.34	17.94	14.37	3.57	1.15	1.40	1.86	.91
42.	29.09	20.32	15.72	4.60	1.50	2.68	1.38	.98
43.	30.49	22.94	22.01	.93	1.92	.92	.94	.89
45.	29.07	21.22	19.38	1.84	1.67	1.61	1.18	1.47
48.	27.72	19.66	15.67	3.99	1.51	1.97	1.41	1.07
52.	29.02	19.08	17.45	1.63	2.30	2.11	1.09	1.37
54.	48.22	30.98	25.20	5.78	2.56	8.70		1.36
55.	17.91	13.19	12.07	1.12	1.06	1.09	.84	.22
56.	30.93	22.22	20.85	1.37	2.58	1.30	1.36	1.12
57.	52.48	39.10	34.07	5.03	2.94	3.22	2.07	2.18

TABLE IX

The average cost per pupil for two school years, 1902-03 and 1903-04. This table is derived from Tables VII and VIII which are based on the average number of pupils in daily attendance. Thirty cities.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
5.	33.67	25.33	24.59	.74	2.25	1.64	2.39	.33
6.	25.95	18.52	17.38	1.14	1.53	1.72	1.52	1.63
8.	31.76	22.99	20.34	2.65	1.87	1.92	1.80	1.14
13.	31.88	23.28	18.40	4.88	1.98	1.71	2.10	.79
14.	28.77	19.64	18.23	1.41	2.11	1.62	2.48	1.69
15.	25.00	18.58	16.39	2.19	1.55	1.69	1.57	.69
16.	28.39	21.35	19.20	2.15	1.86	1.63	1.71	.98
20.	23.11	17.23	16.64	.59	1.22	1.06	2.12	.70
27.	26.10	18.08	14.84	3.25	2.01	1.63	.91	.85
28.	29.84	20.79	19.63	1.16	2.13	1.00		
29.	27.11	17.80	16.99	.81	2.07	1.99	1.50	1.26
30.	38.01	26.62	25.62	1.00	2.39		1.76	3.16
31.	29.41	18.85	18.06	.79	1.94		3.30	2.30
32.	31.24	20.23	17.29	2.94	1.98	.89	1.97	2.34
34.	33.75	25.16	21.69	1.47	3.14		2.37	1.06
35.	27.22	20.88	19.81	1.07	1.51		1.14	1.07
36.	31.82	25.45	20.04	5.41	1.13		1.85	.38
37.	19.98	15.20	11.77	3.43	1.04		1.39	.69
39.	30.39	22.47	18.87	3.60	1.63		1.99	1.25
40.	32.96	22.33	18.81	3.52	1.26	2.03	2.45	1.19
41.	24.99	17.48	15.18	2.30	1.14	1.40	1.67	.47
42.	28.79	17.09	15.58	4.51	1.49	2.61	1.45	.89
43.	28.29	20.42	19.50	.92	1.82	.93	1.62	.77
45.	28.80	20.50	19.26	1.24	1.60	1.75	1.13	1.72
48.	25.26	17.59	14.48	3.11	1.43	1.62	1.40	.70
52.	27.70	17.32	15.63	1.69	2.07	1.91	1.00	2.66
54.	51.47	33.72	27.90	5.82	2.86	6.15	2.32	1.83
55.	19.20	13.24	12.34	.90	1.07	1.11	.99	.39
56.	29.47	21.05	18.09	2.96	2.46	1.13	1.29	1.31
57.	51.86	38.69	33.63	5.06	2.68	3.39	2.04	2.20

EXPLANATION OF TABLES

Table I gives the gross amount spent for maintenance and operation for each city, and the amounts spent for each of the several items of the budget. The amounts spent for all items of expenditure should, of course, when added, give the gross amount spent, which is scored on the table as "Total." The blanks which are found indicate that the city reported nothing under this head, or that this item is included under one head with some other, in which case they are underscored, if possible. The first line of Table I reads as follows: City number one spent \$76,252 for maintenance and operation, of which \$47,712 were spent for teaching, \$2200 for supervision, \$392 for a clerk, \$5032 for janitors' salaries, \$300 for truant officers, \$3919 for text-books, etc. The data given in Table I is for the school year 1902-1903 for fifty-eight cities of from 10,000 to 50,000 inhabitants, located in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey.

Table II gives the same information as Table I for thirty of the same cities for the school year 1903-1904.

Table III reduces each item of the budget to per cent. of the total. The first line reads: In city number one 62.6 per cent. is spent for teaching, 2.9 per cent. for supervision, .5 per cent. for clerk, 6.6 per cent. for janitors' salaries, etc. If the sum of the per cents for all of the items is taken, they should give 100 per cent. This table gives information for fifty-eight cities for the school year 1902-1903, as noted in Table I.

Table IV gives the same information as Table III for thirty of the same cities for the school year 1903-1904.

Table V is derived from Tables III and IV by finding the average for two years. Thus, for city number five, for the first year, teaching and supervision amounted to 75.9 per cent. of the total (see Table III, line 5, first and second items); for the same city for the second year this item was 74.9 per cent. of the total (see Table IV, first line, items one and two); the average of the two, 75.4 per cent., gives the first figure of Table V. In like manner, janitors' salaries, for the first and second years respectively, for city number five amount to 6.6 and 6.8 per cent. This gives us our figure, 6.7 per cent., for janitors' salaries for city number five in Table V (see Table V, first line, column three).

Table VI gives the cost per pupil expressed in dollars and cents. The number used as a divisor here is the figure half-way between the average number of pupils in daily attendance and the average daily enrolment, or average number belonging, as it is sometimes expressed. As stated elsewhere in the text, it is my opinion that this is a better figure than either average daily attendance or average daily enrolment. The only reason that this basis is not used throughout the study is because the figures for average daily enrolment could not be secured for a number

of the cities. In the section giving coefficients of correlation will be found a number of coefficients which were worked out on this basis from this table. This table gives data for forty-eight cities for the school year 1902-1903. The first line reads as follows: City number one spent \$34.18 per pupil for the maintenance and operation of schools, of which \$21.38 per pupil was spent for teaching, \$0.99 per pupil for supervision, \$0.17 per pupil for clerk, \$2.26 per pupil for janitors' salaries, etc.

Table VII gives the cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor in this case. The first line reads as follows: City number one spent \$35.64 per pupil for the maintenance and operation of schools, of which \$22.30 per pupil was spent for teaching, \$1.03 per pupil for supervision, etc. This table gives data for fifty-seven cities for the school year 1902-1903.

Table VIII gives the same information as Table VII, calculated on the same basis for thirty of these cities for the school year 1903-1904. This table is read the same as Table VII.

Table IX gives the average cost per pupil for thirty cities for two years, the school years 1902-1903 and 1903-1904, for the principal items of expense. This table is derived from Tables VII and VIII, which are based on the average number of pupils in daily attendance. The first line reads as follows: In city number five the average for two years of the cost per pupil for maintenance and operation of schools was \$33.67 (1902-1903, \$33.27; and 1903-1904, \$34.08); for teaching and supervision the average was \$25.33; for teaching alone, \$24.59, etc.

Throughout the tables a number written across the space between the columns indicates that this number applies to the two adjoining columns taken together, and similarly an underscore running across three or more columns indicates that the number applies to these columns collectively.

VARIABILITY

In the tables given above, which compare the different items of the school budget on a common basis, the most striking thing to be noticed is the variability which exists among the cities. It is the purpose of this section to consider somewhat minutely the problem of variability in connection with the apportionment of school moneys among the several items of the budget. It may not be out of place here to call attention to the ambiguity if not the positive misrepresentation of facts which results when, as in most cases where such data have been collected, the average alone is given to represent the facts. Of course, if one accepts

the average as meaning simply that the sum of all the cases is divided by their number, no harm is done; but if one takes the average as indicative of the general tendency or as a measure applicable to the majority of the cases, he may be most completely deluded. The average expenditure per pupil for cities Nos. 22, 23, 54, and 57 for the first year (see Table VII) is \$31.94. They spent \$8.94, \$12.85, \$54.72, and \$51.25 respectively per pupil. The average in this case does not correctly represent the group nor any particular city within the group. The thing that interests us in the measurement of any trait in a group is the range or limits within which all of the cases lie, and the grouping of the cases within these limits.

If we consider the facts found in the tables already given (Tables I to IX), we find that cities differ greatly not only in the amount per pupil which they spend for the maintenance and operation of their schools, but also that even where cities spend about the same amount per child, the distribution of this money among the several items of the budget is very different. Again, when we consider simply the distribution of the money that is spent, regardless of the amount, as is done in the table which gives the per cent. which each item is of the total cost of maintenance and operation, we find that there is the greatest variability in practice. One city spends 44 % of the cost for maintenance and operation (see Table III) for teaching and supervision, while another spends 82 % for the same purposes; the janitors receive from 3 % to 14 % of the money used to run the schools; supervision costs one city 1 % and another city 17 % of the whole amount spent; salaries for teaching vary from 27 % to 73 % of the budget. It would seem impossible that the money is properly distributed in every case when we consider this remarkable variability in practice.

The undistributed expenditure reported under the head "Miscellaneous" needs to be considered in any argument concerning the variability in any item as reported by several cities. It is possible that a very large part of the amount thus reported properly belongs to some one of the items for which a report has been made. It may be that the item teaching, supervision, fuel, janitors' salaries, repairs, or some other would be greatly increased if the report had properly distributed the money. It was to guard against any such obscurity that the attempt was

made in this study to secure a complete distribution of expenditures in the cities from which information was received, and, as has been noted above, this attempt was to a remarkable degree successful. Thirty cities out of fifty-eight for the first year report nothing under this head; sixteen reported less than 2 %, ten others less than 5 %, and the two remaining reported 5.14 % and 6.75 %, respectively, as unclassified expenditures. For the second year, of thirty cities reporting, eighteen report nothing under "Miscellaneous"; and of the remaining twelve, eight report 1 % or less; three, 2 %; and one, 3.76 % under this head. It is quite evident, I believe, that the miscellaneous item is so small, even where it occurs, that it may not be used as an explanation of the variability which occurs in all items of expenditure; and I feel that it is safe to say that the accurate distributions of the amounts reported under this head would not alter the conclusions reached in this paper.

It might be argued that the great variability is due to the fact that the cities for which data are given are not comparable, that one has at its command a much larger amount of money in proportion to the number of children to be educated than another, and hence the variability. It is true that rightly or wrongly some of these cities are much better provided with money than others, but that does not seem to be the cause of the great variability in the apportionment of the money which they do have. Take, for example, cities Nos. 3, 6, 19, 21, 44, and 56. From the information given in Tables I and III, the following table may be built up:

No. of City.	Total Expense.	No. of pupils in daily attendance.	Cost per pupil.
3.	\$52,708	1,876	\$28.06
6.	50,613	1,826	27.65
19.	52,870	1,831	28.90
21.	52,178	2,127	24.50
44.	48,410	1,850	26.18
56.	50,192	1,794	28.01

Per cent. spent for each item:

No. of City.	Teaching.	Supervision.	Janitors.	Fuel.	Text-books and Supplies.	Repairs.
3.	68.2	4.	7.1	4.7	6.1	3.9
6.	72.9	4.2	5.3	6.1	6.6	4.
19.	62.9	3.4	6.8	7.2	7.5	5.7
21.	69.1	12.6	5.9	3.8	1.5	3.8
44.	63.8	4.6	6.1	10.	1.2	4.3
56.	54.6	16.3	8.4	4.4	3.4	5.3

The variation found cannot be due in these cases to a large undistributed amount, for five of these cities distributed their expenditures in the special reports received from them according to the classification given, without finding it necessary to report anything under the head "Miscellaneous," and the other (No. 56) reports only nine-tenths of 1 % under this head (see Table III).

In these cities the amount of money available and the number of pupils to be provided for do not differ very much. We might expect that if there were any principle which controlled the apportionment of money, or if the money were apportioned in the best way, the proportion of the whole cost of maintenance and operation spent for any of the principal items would be approximately the same in these cities. By glancing at the table, however, we see here the same marked variability which is found when the whole number of cities is considered. Not that there is quite so great a range, which would be very unusual because of the limited number of cases, but that the distribution of money among the several items seems not to be determined by any common principle.

It seems strange that of two cities (No. 6 and No. 56) which spend respectively \$50,613 for 1826 pupils and \$50,192 for 1794 pupils, one should spend 72.9 % of its money for teaching while the other spends 54.6 % for the same purpose. Of course, if we combine the items of teaching and supervision, they do not differ so much (77.1 % and 70.9 %), but if this combination of items is made throughout for the cities of this table, we have a variation in the proportion spent for teaching and supervision of from 66.3 % to 81.7 % of the total (see Nos. 19 and 21). For the other items in these cities in which the conditions seem to be so much alike, the table shows the same variability. Janitors' salaries vary from 5.3 % to 8.4 %; fuel, from 3.8 % to 10 % (in cities which spend respectively \$24.50 and \$26.18 per pupil); text-books and supplies, from 1.2 % to 7.5 %; and repairs from 3.8 % to 5.7 % of the total.

It is, indeed, strange if 44 % of the cost of maintenance and operation can in one city provide for proper teaching and supervision (see Table III.), that in another city, which spends more per pupil, it requires 82 % of the total for this item. It would seem that owing to tradition, to poor business management, or

to some other more invidious cause, the money spent is not always spent to the best advantage. It seems possible, also, that the superintendent whose attention is called to the wide variation in any one item of his budget, might be led to investigate the matter, in order to determine whether there is any good reason for such deviation from the ordinary or normal condition of affairs.

A more careful study of the variability of the several items of the budget shows that in many cases a large expenditure for one item is accompanied by a small expenditure for another. Again, in other cases large expenditures in one item seem to be accompanied by large expenditures in others and small expenditures in some by small expenditures in others. One has but to examine carefully the tables to have suggested the possibility of significant relationships. In another section I shall consider this matter more fully and measure a number of these relationships exactly by means of the Pearson Coefficient of Correlation.

There are three ways in which we shall express the variability in order to get as clear an idea as is possible of the lack of uniformity and in order to suggest the problems which arise because of this variability.

From the tables already given (see Tables I to IX), it is possible for us to make out frequency tables like those which follow. In these tables the first column gives the amount of money spent, or the per cent. of the total which the item is, and the second column gives the number of instances where this is true. They give all the facts concerning variability; not only the range or limits within which all of the cases lie, but also the exact placing of every case.

EXPLANATION OF TABLES

Tables X, XI, XII, and XIII give information for the cities reporting for the school year 1902-1903.

Table X reads as follows: one city spends 27 % for teaching; one, 49 %; one, 52 %; one, 53 %; two, 54 %, etc.

Table XI reads as follows: two cities spend 1 % for supervision; eleven spend, 2 %; seven, 3 %, etc.

Reading the first lines of Tables XII and XIII, we find that four cities spent 3 % of the budget for janitors' salaries, and that six cities spent 3 % for fuel.

TABLES OF FREQUENCY

The per cent. of the total expenditure for maintenance and operation which is spent for teaching, supervision, janitors' salaries, and fuel. Fifty-eight cities, reporting for the school year 1902-03.

TABLE X		TABLE XI		TABLE XII		TABLE XIII	
Teaching.		Supervision.		Janitors' Salaries.		Fuel.	
Per Cent.	Frequency.	Per Cent.	Frequency.	Per Cent.	Frequency.	Per Cent.	Frequency.
27	1	1	2	3	4	3	6
28	1	2	11	4	6	4	12
29	0	3	7	5	15	5	10
30	0	4	6	6	19	6	11
31	0	5	1	7	7	7	4
32	0	6	2	8	3	8	3
33	0	7	5	9	2	9	3
34	0	8	0	10	0	10	2
35	0	9	5	11	0	11	0
36	0	10	3	12	0	12	1
37	0	11	4	13	0	13	0
38	0	12	3	14	1	14	0
39	0	13	2			15	0
40	0	14	0			16	2
41	0	15	1				
42	0	16	4				
43	0	17	2				
44	0						
45	0						
46	0						
47	0						
48	0						
49	1						
50	0						
51	0						
52	1						
53	1						
54	2						
55	2						
56	3						
57	0						
58	3						
59	2						
60	0						
61	3						
62	6						
63	6						
64	6						
65	3						
66	2						
67	3						
68	2						
69	2						
70	1						
71	2						
72	1						
73	4						

TABLES OF FREQUENCY

The per cent. of the total expenditure for maintenance and operation which is spent for teaching, supervision, janitors' salaries, and fuel. Average for two years, thirty cities reporting for the school years 1902-03 and 1903-04.

TABLE XIV		TABLE XV		TABLE XVI		TABLE XVII	
Teaching.		Supervision.		Janitors' Salaries.		Fuel.	
Per Cent.	Frequency.	Per Cent.	Frequency.	Per Cent.	Frequency.	Per Cent.	Frequency.
54	3	2	4	3	2	3	4
55	2	3	4	4	1	4	3
56	1	4	5	5	10	5	8
57	2	5	0	6	11	6	9
58	0	6	1	7	4	7	2
59	2	7	1	8	1	8	2
60	2	8	2	9	1	9	0
61	1	9	2			10	0
62	3	10	2			11	1
63	1	11	3				
64	4	12	2				
65	2	13	0				
66	2	14	0				
67	2	15	2				
68	1	16	0				
69	0	17	2				
70	0						
71	0						
72	2						
73	1						

TABLES OF FREQUENCY

Cost per pupil expressed in dollars, the average daily attendance being used as the basis of calculation. Fifty-eight cities, reporting for the school year 1902-03.

TABLE XVIII		TABLE XIX		TABLE XX		TABLE XXI		TABLE XXII	
Total Cost per Pupil.		Teaching and Supervision.		Janitors' Salaries.		Fuel.		Text-Books and Supplies.	
Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.
8	1	6	1	.4	1	.4	1	.2	2
9	0	7	1	.5	0	.5	0	.3	1
10	0	8	0	.6	0	.6	0	.4	1
11	0	9	1	.7	0	.7	1	.5	0
12	1	10	0	.8	0	.8	1	.6	0
13	0	11	1	.9	2	.9	1	.7	1
14	0	12	0	1.0	3	1.0	2	.8	0
15	1	13	1	1.1	4	1.1	3	.9	2
16	0	14	2	1.2	0	1.2	5	1.0	2
17	0	15	3	1.3	2	1.3	4	1.1	2
18	0	16	3	1.4	3	1.4	3	1.2	1
19	1	17	6	1.5	5	1.5	2	1.3	3
20	2	18	3	1.6	2	1.6	3	1.4	1
21	2	19	8	1.7	3	1.7	3	1.5	2
22	2	20	3	1.8	4	1.8	3	1.6	4
23	2	21	5	1.9	8	1.9	1	1.7	3
24	4	22	1	2.0	3	2.0	5	1.8	1
25	1	23	5	2.1	3	2.1	0	1.9	3
26	4	24	4	2.2	2	2.2	3	2.0	5
27	2	25	3	2.3	4	2.3	2	2.1	2
28	8	26	2	2.4	2	2.4	0	2.2	0
29	4	27	0	2.5	2	2.5	0	2.3	1
30	2	28	0	2.6	1	2.6	2	2.4	0
31	5	29	0	2.7	0	2.7	1	2.5	1
32	3	30	1	2.8	0	2.8	0	2.6	0
33	1	31	0	2.9	1	2.9	1	2.7	0
34	2	32	1	3.0	1	3.0	0	2.8	0
35	3	33	0			3.1	0	2.9	0
36	1	34	0			3.2	0	3.0	1
37	1	35	0			3.3	1	3.1	0
38	0	36	1			3.4	1	3.2	0
39	0	37	0			3.5	0	3.3	0
40	0	38	1			3.6	1	3.4	0
41	1					3.7	0	3.5	1
42	0					3.8	0	3.6	0
43	1					3.9	0	3.7	0
44	0					4.0	0	3.8	0
45	0					4.1	0	3.9	0
46	0					4.2	0	4.0	0
47	0					4.3	0	4.1	0
48	0					4.4	0	4.2	0
49	0					4.5	0	4.3	0
50	0					4.6	0	4.4	0
51	1					4.7	1	4.5	0
52	0							4.6	1
53	0								
54	1								

TABLES OF FREQUENCY

Cost per pupil expressed in dollars, average for two years, the average daily attendance being used as the basis of calculation. Thirty cities, reporting for the school years 1902-03 and 1903-04.

TABLE XXIII		TABLE XXIV		TABLE XXV		TABLE XXVI		TABLE XXVII	
Total Cost per Pupil.		Teaching and Supervision.		Janitors' Salaries.		Fuel.		Text-Books and Supplies.	
Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.
19	2								
20	0	13	1	1.0	2	.9	2	.8	1
21	0	14	0	1.1	2	1.0	1	.9	1
22	0	15	1	1.2	2	1.1	1	1.0	2
23	1	16	0	1.3	0	1.2	1	1.1	2
24	1	17	6	1.4	2	1.3	1	1.2	0
25	3	18	4	1.5	3	1.4	2	1.3	0
26	1	19	1	1.6	2	1.5	3	1.4	1
27	3	20	5	1.7	0	1.6	3	1.5	0
28	5	21	2	1.8	3	1.7	2	1.6	6
29	3	22	3	1.9	3	1.8	2	1.7	3
30	1	23	1	2.0	3	1.9	2	1.8	0
31	4	24	0	2.1	2	2.0	1	1.9	3
32	1	25	3	2.2	1	2.1	2	2.0	1
33	2	26	1	2.3	1	2.2	0	2.1	0
34	0	27	0	2.4	1	2.3	3	2.2	0
35	0	28	0	2.5	0	2.4	2	2.3	0
36	0	29	0	2.6	1	2.5	0	2.4	0
37	0	30	0	2.7	0	2.6	0	2.5	0
38	1	31	0	2.8	1	2.7	0	2.6	1
39	0	32	0	2.9	0	2.8	0	2.7	0
40	0	33	1	3.0	0	2.9	0	2.8	0
41	0	34	0	3.1	1	3.0	0	2.9	0
42	0	35	0			3.1	0	3.0	0
43	0	36	0			3.2	0	3.1	0
44	0	37	0			3.3	1	3.2	0
45	0	38	;					3.3	1
46	0							3.4	0
47	0							3.5	0
48	0							3.6	0
49	0							3.7	0
50	0							3.8	0
51	2							3.9	0
								4.0	0
								4.1	0
								4.2	0
								4.3	0
								4.4	0
								4.5	0
								4.6	0
								4.7	0
								4.8	0
								4.9	0
								5.0	0
								5.1	0
								5.2	0
								5.3	0
								5.4	0
								5.5	0
								5.6	0
								5.7	0
								5.8	0
								5.9	0
								6.0	0
								6.1	1

Tables XIV to XVII, inclusive, are frequency tables based upon the average of the first and second years' figures from thirty cities. It will be noticed that the range is somewhat less, due largely to the fact that there are fewer cases. These tables are read precisely as Tables X to XIII, illustrated above.

The tables for the first year's figures alone are, of course, less reliable than those which give the average for two years, so far as any one city is concerned. However, the greater variability found in these figures for the first year which does not appear when the average for the two years is taken is due largely to the fact that many of the cities which give the extreme variation have not yet reported for two years. In Table No. X, for example, the cities reporting 27 %, 28 %, 49 %, and 52 %, respectively, for teaching, are cities Nos. 47, 23, 11, and 52, none of which reported for the second year (see Tables III and IV). The variability for the first year's figures is, simply because there are more cases, more nearly a correct representation of the facts of variability, we believe, than the average of the two years where many of the extreme cases are not found. It is remarkable that so small a proportion as 27 % should be devoted to teaching in one case, when other cities use 73 % of their funds for this purpose,—that some cities should give 2.7 times as great a proportion for teaching as others.

The variation in the proportion which is spent for supervision is not less remarkable. Here the cities seem to divide themselves into groups—those which spend a comparatively large proportion of their money for supervision, and those in which this item is allowed a smaller share of the money. One feels that supervision which costs 17 % of the money available for schools should produce remarkable results in the way of saving time and energy for teachers and pupils, if it is to be justified when compared with other cities in which 2 % of the budget seems to secure satisfactory supervision.

The range for janitors' salaries (Table XII) may indicate a real difference in the care of school buildings, or, in rare instances, perhaps some connection between ward politics and the janitors' position. Leaving out the most extreme case, it seems rather remarkable that in some instances one dollar out of every eleven available for the maintenance and operation of the schools should be spent for the care of buildings.

That fuel should be allowed in some cities three times as great a proportion of the money spent as in others (see Table XIII) would not seem strange if our cities were found in sections of the country with very different climatic conditions; but that four or even five times as much should be necessary under conditions which are not greatly different seems preposterous.

Tables XIV to XVII, which are based on the average for two years, give the most accurate information we have for the thirty cities which reported two years. The limits within which the cases lie are, as has already been noted, somewhat smaller than in the case of the first year's figures considered alone. This is due largely to the fact that we have a smaller number of cases. The variability is, nevertheless, sufficiently striking with a range of from 54 % to 73 % for teaching, from 2 % to 17 % for supervision, from 3 % to 9 % for janitors' salaries, and from 3 % to 11 % for fuel.

Tables XVIII to XXII give the variability for the cost per pupil for some of the principal items of the budget. The cost per pupil as given here is based on the average daily attendance (see Table VII).

Table XVIII reads as follows: one city spent for maintenance and operation per pupil in attendance, \$8.00; one city, \$12.00; one city, \$15.00; one city, \$19.00; two cities, \$20.00; two cities, \$21.00, etc.

Tables XXIII to XXVII give the variability for some of the principal items of the budget on the cost per pupil basis, the average amount spent per pupil for two years being used (see Table IX). Table XXIII, for instance, reads as follows: the average amount for two years spent for maintenance and operation per pupil in attendance for two cities was \$29.00; one city, \$23.00; one city, \$24.00; three cities, \$25.00, etc.

In the tables given above, we have an expression of the variability in terms of the amount of money spent. We sometimes think of the cities in the region covered by this study as spending a very large amount for public education. The average inhabitant, if not the school officers themselves, of any of these cities will probably say that their school system is quite as good as any other, or at least as good as the average. As a matter of fact, we find a great variability in the total amount per pupil

spent, as well as in the amount spent for various items. No one believes that the city which spends \$54.00 per pupil furnishes an education six and three-quarter times as good as the city which spends only \$8.00 per pupil. On the other hand, it hardly seems possible that the opportunity for education in the eight-dollar city can be equal to that found in the fifty-four-dollar city. Teaching and supervision which cost \$6.00 per child are hardly likely to be as good as those which cost three, four, five, or even six times as much. No argument based upon the difference in the cost of living could account for so great a difference in the cost of instruction. Either the teachers receive a very much smaller salary in the cities which pay a relatively small amount per pupil, or they have much larger classes to instruct, or both conditions taken together explain the variability.

One may infer that the number of children determines the number of seatings which must be furnished, if not the number and size of buildings; and yet janitors' salaries may cost from 40 cents to \$3.00 per pupil, and fuel from 40 cents to \$4.70 per pupil.

If we neglect the cases where a very little is spent for textbooks and supplies,—the cases where they are not furnished free to pupils,—we still find that some cities spend three or four times as much per pupil as others for these articles. It seems rather remarkable that the real value of books and supplies furnished to pupils should vary so much; and even if this were the case, one might question whether the money is spent to best advantage in those cities which spend the larger amounts. Might not a part of this money have been spent to greater advantage in some other way?

The limits within which all of the cases lie are significant, but are not so true a measure of the variability of the group as are the limits within which the middle 50 % of the cases lie. A single exceptional case may double the range within which all of the cases lie, but manifestly this does not double the variability of the group. This figure, which we call $2Q$, is found by counting in from both the upper and lower limits until 25 % of the cases have been covered, and then finding the range within which the remaining 50 % of the cases lie. For instance, in Table X, in which there are 58 cases, we count off from the

lower limit fifteen cases (25 % = 14½), which brings us to the group of three cities which spend 58 % of their money for teaching; in like manner, counting from the other extreme, 25 % of the cases are found to spend more than 67 % of their money for teaching. The limits within which the middle 50 % of the cases lie are, then, 58 and 67, and 2 Q equals (67 — 58 = 9) nine. After we have found the 2 Q, the relation which it bears to the median gives us a still better idea of the variability of the group. If it is desired to compare the variability of the group in several traits, the relation of the 2 Q to the square root of the median is more exact than either of the figures before suggested because this measure will be less affected by errors due to inaccuracy of measurements, or to the small number of measurements made. In the table below, 2 Q, the per cent. which 2 Q is of the median, and the per cent. which 2 Q is of the square root of the median are given. This table is derived from the frequency tables, Tables X to XXVII inclusive.

	2 Q.	Per cent. which 2 Q is of the median.	Per cent. which 2 Q is of the square root of the median.
Per cent. of total spent for each item. First year's figures. See Tables X to XIII inclusive:			
Teaching.....	9	14	113
Supervision.....	8	105	290
Janitors' Salaries.....	1	16	40
Fuel.....	3	50	123
Per cent. of total spent for each item. Average of two years' figures. See Tables XIV to XVII inclusive:			
Teaching.....	9	14	112
Supervision.....	8	100	283
Janitors' Salaries.....	4	65	166
Fuel.....	1	16	42
Cost per pupil. First year's figures. See Tables XVIII to XXII inclusive:			
Total cost per pupil.....	7	25	132
Teaching and Supervision.....	6	33	136
Janitors' Salaries.....	.7	37	50
Fuel.....	.8	50	61
Text-Books and Supplies.....	.9	53	69

	2 Q.	Per cent. which 2 Q is of the median.	Per cent. which 2 Q is of the square root of the median.
Cost per pupil. Average of two years' figures. See Tables XXIII to XXVII inclusive:			
Total cost per pupil	5	17	93
Teaching and Supervision.....	5	25	111
Janitors' Salaries.....	.7	37	50
Fuel.....	.7	41	53
Text-Books and Supplies.....	.8	50	61

In the diagrams which follow, the variability is expressed graphically. The heavy line gives the distribution based on the average of the first and second years' figures, while the dotted line gives the distribution for the first year's figures from those cities which reported both years. Along the horizontal axis is indicated the per cent. of the total (or cost per pupil), while the vertical distance indicates the number of cases.

This method of indicating variability enables one who is accustomed to this mode of representation to take in at a glance at least the more striking features. It will be noticed that in the main the distribution for the first year's figures, taken alone (the dotted line), conforms to that for the average of the two years. This is significant in that it shows that the conclusions which may be drawn from the one year's figures are fairly reliable, and that we were justified in our treatment of variability above to make use of the first year's figures with the greater number of cases.

FIG. 1.

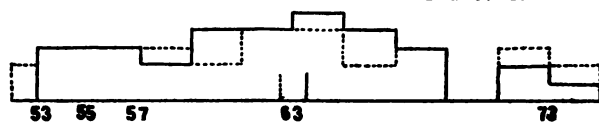


FIG. 2.

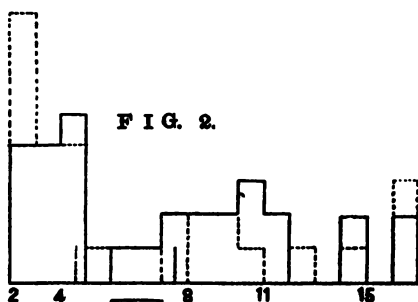


FIG. 3.

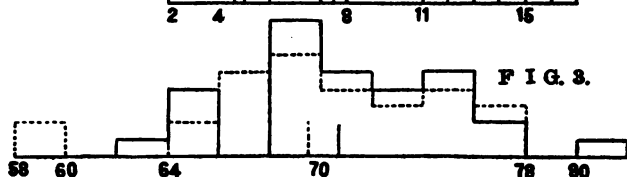
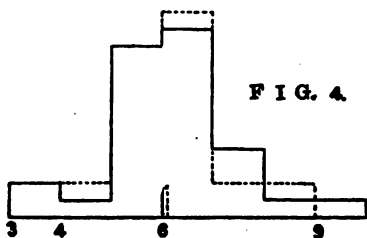


FIG. 4.



SURFACES OF FREQUENCY ON THE PER CENT. OF TOTAL BASIS

Fig. 1.—Teaching.

Fig. 2.—Supervision.

Fig. 3.—Teaching and Supervision.

Fig. 4.—Janitors' Salaries.

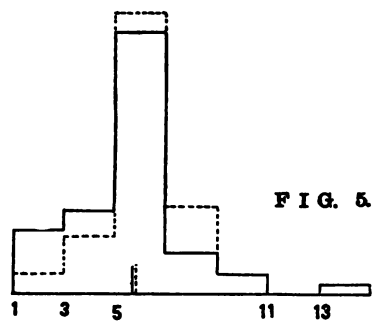


FIG. 5.

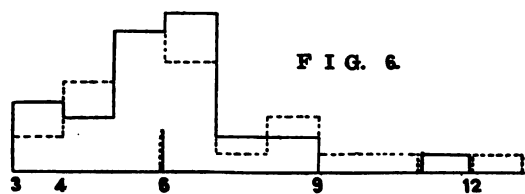


FIG. 6.

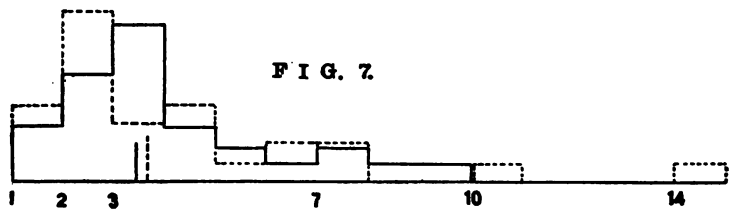
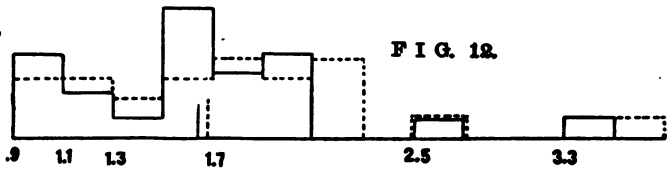
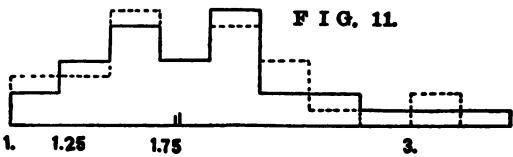
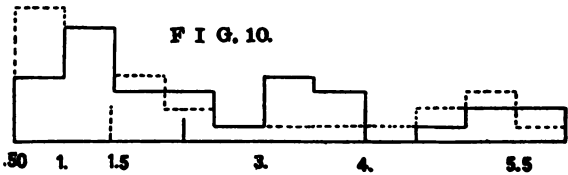
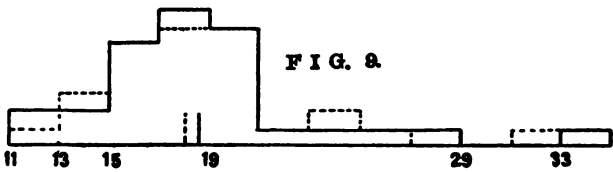
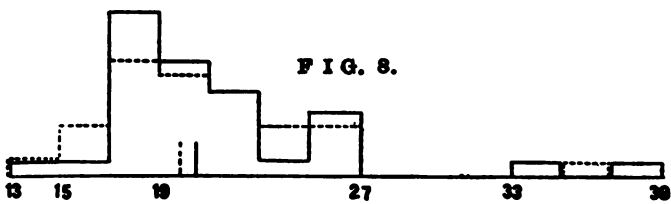


FIG. 7.

SURFACES OF FREQUENCY ON THE PER CENT. OF TOTAL BASIS

- Fig. 5.—Text-Books and Supplies.
- Fig. 6.—Fuel.
- Fig. 7.—Repairs.



SURFACES OF FREQUENCY ON THE COST PER PUPIL BASIS

- Fig. 8.—Teaching and Supervision.
- Fig. 9.—Teaching.
- Fig. 10.—Supervision.
- Fig. 11.—Janitors' Salaries.
- Fig. 12.—Text-Books and Supplies.

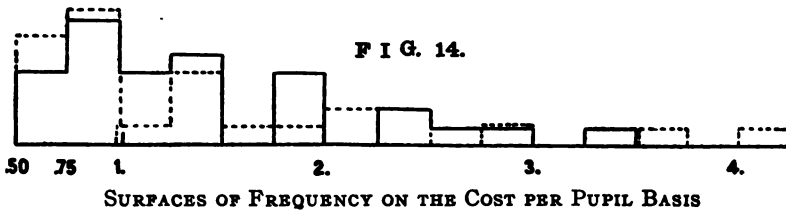
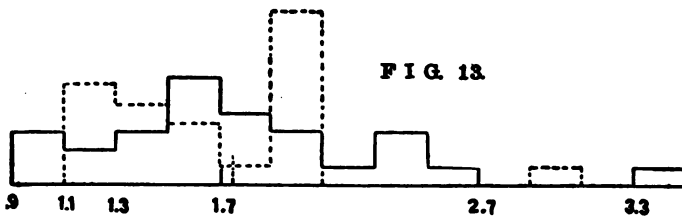


Fig. 13.—Fuel.

Fig. 14.—Repairs.

Still another method of indicating variability is by means of giving the deviation for each of the items from some central figure which may be agreed upon.

In the tables which follow, the deviations are calculated from the median. The median, which is simply the point above and below which fifty per cent. of the cases lie, is, we believe, the best figure to use in this case as representing a central tendency. It is unambiguous and is not so much influenced by extreme cases nor by error as the average would be.

EXPLANATION OF TABLES

Table XXVIII gives the medians and deviations from them for the cost per pupil based on the average number of pupils in daily attendance. The data are from fifty-seven cities reporting for the school year 1902-1903 (see Table VII). The first line of the table gives the medians. One half of the cities spend less than \$28.50 or just \$28.50 per pupil, while the other half spend more than \$28.50 or just that amount per pupil for maintenance and operation of their schools. In like manner, \$19.96 marks the point above and below which half of the cities lie in their expenditure for teaching and supervision; \$18.10 is the median for teaching alone; \$1.75 is the median for supervision, and so on for the other items given. In the body of the table, deviations below the median are marked with a minus sign, those above are not marked.

Line number nine reads as follows: City number eight spends \$2.66 per pupil more than the median (\$28.50) for the maintenance and operation of schools; \$2.37 per pupil more than the median (\$19.96) for teaching and supervision; the median amount, \$18.10 per pupil, for teaching; \$2.48 per pupil more than the median for supervision, etc.

Table XXIX gives the medians and deviations from them for the per cent. which each item is of the total cost of maintenance and operation. The data from which this table is derived are found in Table III, which gives information for fifty-eight cities for the school year 1902-1903. The first line of the table gives the medians for the several items of expenditure expressed as per cents and hundredths of a per cent. As in Table XXVIII, the deviations below the median are marked with a minus sign while those above are left unmarked. Line two reads as follows: City number one spent 5.5 % less than the median (71.15 %) for teaching and supervision; *i. e.*, 65.65 % of the total cost of maintenance and operation was spent for teaching and supervision. If we skip the next two items, we find that this city spent .42 % more than the median (6.19 %) for janitors' salaries; 2.24 % more than the median (2.91 %) for text-books, etc.

Table XXX gives medians and deviations on cost per pupil basis for thirty cities, reporting for the school year 1903-1904. The figures refer to dollars and tenths of a dollar. This table is derived from Table VIII. The explanation given for Table XXVIII makes this table clear, since this table differs from Table XXVIII only in that it is based on the second year's data and in that it gives the deviations for fewer items.

Table XXXI gives medians and deviations for per cent. which each item is of the total cost of maintenance and operation. The data are from thirty cities for the school year 1903-1904 (see Table IV). The figures refer to per cents and tenths of one per cent. The explanation for Table XXIX, which gives the same information for the school year 1902-1903, may be referred to by any one who has difficulty in understanding this table.

Tables XXXII and XXXIII give medians and deviations from medians on both cost per pupil and per cent. of total basis, which are based on two years' figures. These tables are made up by taking the average of the cost per pupil, or the per cent. of total of each item for two years. From these tables, giving the average for each item for two years, medians are calculated and deviations found as in the tables based on a single year's figures. These tables are read precisely as Tables XXX and XXXI.

From these tables we can get again the distribution of the cases by grouping those which vary by the same amount. If

this were done we would get frequency tables similar to those given above, or if we represented the distribution graphically, surfaces of distribution like those already given.

By examining these tables carefully, it will be seen that certain variations in one item are accompanied by like variations in some other item, or that a plus deviation in one item is accompanied by a negative deviation for the other, or *vice versa*. Take, for example, the items of janitors' salaries and salaries for teaching and supervision, as given in Table XXIX (per cent. of total first year's figures). In these items one is struck by the fact that a plus deviation in salaries paid janitors is often accompanied by a negative deviation for teaching and supervision, and *vice versa*. Picking out the cases, a table like the following may be made:

No. of City.	Janitors' Salaries.	Salaries for Teaching and Supervision.
1.	+4.	-5.5
7.	+3.3	-3.4
9.	+1.3	-1.5
11.	+3.	-9.9
14.	+ .7	-3.6
17.	+ .8	- .5
19.	+ .6	-5.9
23.	+8.7	-13.0
27.	+1.1	-4.5
28.	+1.0	-2.0
29.	+ .8	-6.6
30.	+ .1	- .1
31.	+ .4	-11.8
34.	+1.9	-2.4
43.	+1.5	-2.4
47.	+2.3	-26.9
52.	+ .8	-12.2
56.	+2.2	- .2
6.	- .9	+5.9
8.	- .1	+ .5
10.	- .3	+4.3
20.	-1.0	+2.4
21.	- .3	+10.5
22.	-2.0	+3.9
25.	-1.3	+6.7
26.	- .3	+1.8
33.	- .1	+11.1
36.	-2.7	+5.2
37.	- .8	+4.9
38.	-2.4	+2.8
39.	-1.0	+2.2
46.	-1.6	+1.4
49.	-2.2	+4.8
51.	- .7	+8.4
57.	-1.5	+3.4
58.	- .8	+1.6

TABLE XXVIII (Continued)

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Fifty-eight cities, for the school year 1902-03.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books.	Supplies.
Medians.	28.50	19.96	18.10	1.75	1.87	.82	.64
29.	1.00	— .89	.11	— .89	.19		
30.	8.82	6.30	7.15	— .74	.49	— .18	.40
31.	— .60	— 3.42	— 2.35	— .96	— .03		
32.	5.99	.40	.97	— .46	.06	— .45	0
33.	— 3.65	0	— 1.32	1.43	— .35		— .47
34.	7.46	4.75	5.05	— .19	1.05	— .80	— .31
35.	— 3.98	— 1.60	— .23	— 1.26	— .27	— .80	
36.	3.44	4.46	.78	3.79	— .76		— .43
37.	— 9.24	— 5.31	— 6.70	1.50	— .86		
38.	— 4.94	— 3.00	— 2.89	0	— .96	— .77	— .54
39.	3.51	3.53	1.84	1.80	— .20		— .08
40.	6.29	3.36	3.80	— .33	— .49	— .22	.81
41.	— 3.85	— 2.94	— 2.11	— .72	— .74		
42.	0	— .06	— 2.63	2.58	— .38	.61	.48
43.	— 2.41	— 2.04	— 1.10	— .83	— .14	— .33	— .19
44.	— 2.32	— 2.08	— 1.41	— .56	— .29	— .51	
45.	.03	— .18	1.04	— 1.11	— .34	.73	— .29
46.	13.02	10.28	7.43	2.96	.04	.37	.08
47.	— 7.79	— 10.81	— 12.32	1.62	— .12	— .13	
48.	— 5.75	— 4.44	— 4.81	.48	— .51	.15	— .33
49.	— 6.30	— 3.07	— 3.90	.94	— .98	.33	— .42
50.							
51.	3.55	5.54	2.95	2.70	— .11	— .23	— .49
52.	— 2.11	— 4.40	— 4.29	0	— .03	— .03	.28
53.	2.11	4.27	2.39	1.99	.24		
54.	26.22	6.51	12.50	4.12	1.18	1.29	1.86
55.	— 8.00	— 6.66	— 5.49	— 1.06	— .78		
56.	— .49	— .07	— 2.77	2.81	.48	— .37	— .12
57.	22.75	18.33	15.10	3.34	.55	.52	1.59
58.	— 6.99	— 4.33	— 4.55	.33	— .70		

TABLE XXVIII (Continued)

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Fifty-eight cities, for the school year 1902-03.

Number of City.	Text-Books and Supplies.	Fuel.	Repairs.	Furniture.	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	1.68	1.63	1.09	.18	.18	.14	.63
29.	.33	— .12			.17	.05	
30.	0	.22	1.66	.17	— .11	.29	
31.	— .12	1.86	.70	.18			.38
32.	— .67	.62	2.58	.69	.03	.52	.66
33.		— .39	.08				— .61
34.	— 1.33	1.98	— .57	.44	.05		— .46
35.		— .24	— .41	— .03	— .02	.08	.36
36.		.03	— .37	.24	.01	.14	.94
37.		— .48	— .64				0
38.	— 1.53	— .33	1.23	— .12	0	.16	— .32
39.			.27			1.23	
40.	.37		.12	.01			— .18
41.	— .28	— .14	— 1.05	— .02			.64
42.	.87		— .29	.15	— .02	— .03	
43.	— .74	.68	— .44	0	.04	— .04	.06
44.		.99	.03	— .02	0	— .03	
45.	.22	.55	.89	— .04	— .13	.01	.05
46.	.23	0	— .02	.41	.05	.12	— .59
47.		1.71	1.64	.25	— .14	0	
48.	— .40	— .24	— .75	— .09	— .13	— .07	.10
49.	— .31	— .41	— .80	.03	.02	— .02	— .57
50.							
51.	— .94	.16	— .50	— .14	.07	.12	
52.	.03		2.86		.08	— .08	— .16
53.			— .09	.25			
54.	2.93	1.09	1.21	.08	1.03	.07	.03
55.	.46	— .49	— .52	.12	.11	.10	1.38
56.	— .71	— .41	.41	0	— .12	— .02	— .38
57.	1.89	.38	1.14	.28	.04	.09	
58.	— .29	— .94	.03		— .15	.29	

TABLE XXIX

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902-03. The figures refer to per cents and hundredths of per cents.

Number of City.	Teaching and Supervision.	Supervision.	Teaching.	Janitors' Salaries.	Text-Books.	Supplies.	Text-Books and Supplies.
Medians.	71.15	7.62	63.44	6.19	2.91	1.85	5.98
1.	-5.5	-4.73	-.82	.42	2.24	1.47	2.48
2.	-4.75	-4.31	-.33		1.55	-.76	-.44
3.	.99	-3.63	4.71	.88			.16
4.	2.22	3.07	.24	.92	.48	1.04	.29
5.	4.80	-5.38	10.27	.43			.06
6.	5.85	-3.47	9.41	-.93			.57
7.	-3.44	.31	-3.66	3.31	-.41	1.90	.26
8.	.54	5.97	-5.34	-.11	2.06	-.37	.46
9.	-1.49	-4.83	3.43	1.30			.76
10.	4.34	-5.93	10.36	-.28	-.60	1.37	-.46
11.	-9.89	3.93	-13.73	2.95			
12.	2.17	1.53	.76	1.39	.57		
13.	.05	9.73	-9.59	.69	-.30	.97	-.56
14.	-3.62	-2.58	-.95	.65	.23	.65	-.35
15.	2.25	-5.46	7.80	0	1.07	2.12	1.96
16.	4.16	.20	4.05	.22	0	1.47	.24
17.	-.52	.20	-.63	.84	.01	1.22	0
18.	3.74	-3.14	6.97	.60			
19.	-5.86	-3.22	-.55	.62	1.83	.99	1.59
20.	2.38	-5.49	8.04	-1.04	-.52	-.30	-3.05
21.	10.54	4.97	5.66	-.31		-.31	
22.	3.92	-6.44	10.45	-2.01		4.00	
23.	-12.96	21.79	-34.66	8.73			
24.	2.81	1.61	1.29	.08	-2.23	-.43	-4.77
25.	6.67	.28	6.58	-1.25	-2.57	-1.52	-5.32
26.	1.82	9.11	-7.20	-.32	-.88	1.20	-.90
27.	-4.54	2.80	-6.25	1.07	3.19	.07	1.89
28.	-2.03	-3.71	1.77	1.04			-2.21
29.	-6.64	-4.71	-1.84	.80			.84

TABLE XXIX (Continued)

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902-03. The figures refer to per cents and hundredths of per cents.

Number of City.	Fuel.	Repairs.	Furniture.	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	5.91	3.92	.6	.6	.49	1.64
1.	-1.35	1.35	-.20	.86	-.44	0
2.	10.89	1.45	-.10	-.35		
3.	-1.20	-.04	-.08			
4.	-1.13	-.61	-.25	.24		
5.	.20	-2.93	-.27	-.10	-.24	
6.	-1.80	.03		.09		
7.	-2.20	2.71	-.30			
8.	-.08	-.15	-.17	-.35	-.32	
9.	3.49	-3.79				2.95
10.	-1.65	1.38				
11.	.19	.35	-.36			5.11
12.	1.89	-.41				
13.	.68	-1.32	-.13	-.39	-.44	-.85
14.	-2.33	3.16	.15	-.25	-.31	-1.04
15.	.82	-1.18	-.52	-.32	-.44	
16.	-.85	.10				
17.	1.43	.07	-.27	.09	-.29	-1.42
18.	.51	-1.17	-.03			
19.	1.27	1.76		.63		
20.	3.95	-.25				-.71
21.	-2.08	-.09	.17		-.20	
22.	-1.81	2.68				
23.	4.00	3.11	.88		1.56	
24.	.80	-.99				-.37
25.	.67	3.00		-.43	-.16	
26.	-1.47	-.50		-.07	2.74	
27.	-1.24	-1.57	31	1.05	.52	2.76
28.	1.64		16			1.29
29.	-.82			.59	.13	

TABLE XXIX (Continued)

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902-03. The figures refer to per cents and hundredths of per cents.

Number of City.	Teaching and Supervision.	Supervision.	Teaching.	Janitors' Salaries.	Text-Books.	Supplies	Text-Books and Supplies.
Medians.	71.15	7.62	63.44	6.19	2.91	1.85	5.98
30.	— .05	— 4.91	4.95	.13	— 1.19	.93	— 1.49
31.	— 11.76	— 4.78	— 6.99	.40			— .37
32.	— 12.12	— 3.88	— 8.15	— .59	— 1.84	.02	— 3.05
33.	11.17	5.18	4.08	— .05		— 1.16	
34.	— 2.37	— 3.19	1.01	1.94	— 2.85	— .93	— 5.01
35.	4.05	— 5.60	9.74	.36	— 2.82		
36.	5.20	9.65	— 4.46	— 2.73		— 1.20	
37.	4.92	9.27	— 4.26	— .83			
38.	2.80	— .21	1.10	— 2.35	— 2.69	— 1.43	— 5.35
39.	2.19	3.47	— 1.19	— .99		— .10	
40.	— 3.92	— 3.58	— .25	— 2.25	— 1.17	2.29	— .11
41.	— 2.07	— 4.42	1.44	— 1.60			— .30
42.	— 1.46	6.86	— 9.23	— .96	2.13	2.06	2.96
43.	— 2.37	— 3.99	1.81	1.46	— 1.03	— .16	— 2.42
44.	— 2.85	— 2.97	.31	— .14	— 1.72		
45.	— 1.81	— 5.36	3.64	— .85	2.54	— .64	.67
46.	1.41	3.68	— 2.18	— 1.63	— .05	— .13	— 1.41
47.	— 26.94	8.69	— 35.54	2.25	.44		
48.	— 4.97	2.16	— 5.04	— .21	1.38	— .49	— .34
49.	4.83	4.48	.44	— 2.16	2.28	— .84	.21
50.	— 1.30	— .66	— .55	— 2.80	1.60	— .26	.11
51.	8.39	6.26	2.22	— .72	— 1.04	— 1.38	— 3.65
52.	— 12.21	— 1.02	— 11.10	.81	.08	1.63	.48
53.	7.52	4.17	3.44	.70			
54.	— 4.42	3.12	— 7.45	— .53	.94	2.72	2.43
55.	— 6.30	— 4.17	— 1.94	— .88	2.69		
56.	— .24	8.67	— 8.82	2.18	— 1.30	0	— 2.53
57.	3.42	2.30	1.21	— 1.47	— .29	2.50	.98
58.	1.60	2.03	— .34	— .78			.50

TABLE XXIX (Continued)

Medians and deviations from medians for the per cent, which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902-03. The figures refer to per cents and hundredths of per cents.

Number of City.	Fuel.	Repairs.	Furniture.	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	5.91	3.92	.6	.06	.49	1.64
30.	— .97	3.43	.32	— .42	.65	
31.	6.59	2.49	.66			1.98
32.	.62	6.69	1.89	.02		2.11
33.	— .92	.79				— 1.57
34.	4.09	— 2.46	1.09	.05		— 1.16
35.	— .22	— 1.12	— .04	.07	.38	.24
36.	— .74	— 1.65	.68	— .01	.35	3.25
37.	.08	— 1.58				1.62
38.		5.90	— .39	.18	.74	— .33
39.		.32			3.85	
40.	2.81	— .45	— .09			— .36
41.	.16	— 3.74	0			.35
42.	— .32	— 1.12	.52	— .04	— .14	
43.	2.95	— 1.42	.07	.25	.16	1.17
44.	4.09	.38	— .02	.09	— .09	
45.	— 3.13	3.02	— .16	— .43	.01	0
46.	— 2.00	— 1.34	.79	— .05	.11	— 1.54
47.	10.18	9.28	1.44	— .43	.13	
48.	.25	— 2.43	— .23	— .38	— .22	1.57
49.	— .45	— 2.59	.30	.30	0	— 1.36
50.	.35	2.97	1.51			
51.	— .33	— 2.06	— .48	.18	.29	
52.		11.03		.39	— .31	.15
53.		— .59	.78			
54.	— .94	.29	— .14	1.62	.12	— .44
55.	— .32	— 1.12	.80	.80	— .63	
56.	— 1.54	1.42	0	— .40	— .09	— .76
57.	— 1.99	.43	.27	— .17	— .06	
58.	— 1.67	1.26		— .47	1.45	

TABLE XXX

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Thirty cities, for the school year 1903-04. The figures refer to dollars and tenths of dollars.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	29.08	21.19	18.90	1.74	1.91	1.61	1.67	1.12
5.	5.0	4.3	5.9	-1.0	.4	-.3	1.1	-.7
6.	-4.8	-5.4	-4.2	-.6	-.3	0	.2	1.1
8.	3.3	2.5	3.7	2.5	0	.2	.1	0
13.	5.1	4.3	2.0	3.4	0	.2	.6	-.3
14.	-.3	-1.2	-.3	-.4	.4	0		.2
15.	-4.4	-2.5	-4.2	2.1	-.4	-.2	-.2	-.4
16.	-.9	.1	.3	.4	0	-.1	.3	-.3
20.	-6.0	-3.8	-2.2	-1.1	-.6	.4	.3	-.6
27.	-2.8	-3.0	-4.3	1.9	.1	0	-1.1	-.1
28.	.3	-.6	.6	-.6	.2	-.7		
29.	-4.4	-5.6	-1.1	-1.0	.2	.4	-.2	.1
30.	9.6	5.8	7.1	-.8	.5		0	2.4
31.	1.8	0	1.5	-.9	.1		.4	1.7
32.	-1.1	-1.1	-3.4	2.9	.1	-.8	0	-.1
34.	2.5	.4	1.3	-.4	2.5		-.5	.5
35.	.8	2.2	2.8	-.1	-.5	-1.5	.3	.3
36.	2.6	5.3	2.3	3.6	-.7		.4	-1.2
37.	-8.4	-5.4	-6.7	1.9	-.8		0	-.2
39.	-.3	.3	-1.1	1.9	-.3			0
40.	2.1	.2	-3.2	3.9	-.8	.4		.1
41.	-3.7	-3.2	-4.5	1.8	-.8	-.2	.2	-.2
42.	0	-.9	-3.2	2.9	-.4	1.1	-.3	-.1
43.	1.4	1.7	3.2	-.8	0	-.7	-.7	-.2
45.	0	0	.5	.1	-.2	0	-.5	.4
48.	-1.4	-1.5	-3.2	2.3	-.4	.4	-.3	-.1
52.	-.1	-2.1	-1.5	-.1	.4	.5	-.6	.3
54.	19.1	9.8	6.3	4.0	.7	7.1		.2
55.	-11.2	-8.0	-6.8	-.6	-.9	-.5	-.8	-.7
56.	1.9	1.0	2.0	-.4	.7	-.3	-.3	0
57.	23.4	17.9	15.2	.33	1.0	1.6	.4	1.1

TABLE XXXI

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Thirty cities, for the year 1903-04. The figures refer to per cents and tenths of per cents.

Number of City.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	71.7	64.2	6.3	6.1	5.5	5.8	3.8
5.	3.2	8.5	-4.1	.6	-1.7	2.3	-2.8
6.	-6.5	-3.7	-1.6	.5	1.2	2.0	5.2
8.	1.6	5.8	-3.0	-.4	.1	-.3	-.3
13.	2.8	-3.3	7.1	-.5	-.2	.8	-1.4
14.	-2.4	.2	-1.4	1.8	.1		.9
15.	4.4	-3.7	9.3	.3	0	0	-1.0
16.	4.2	4.1	1.1	.6	-.5	1.3	-.9
20.	4.0	8.8	-3.3	-.6	-.1	1.6	-1.4
27.	-1.9	-8.6	7.7	1.8	.7	-3.6	1.1
28.	-1.4	2.2	-2.5	1.0	-2.5		0
29.	-4.7	-.3	-3.2	2.3		.3	1.3
30.	-1.7	3.1	-3.7	.2		-1.5	5.5
31.	-3.1	1.7	-3.7	.5		4.3	5.3
32.	0	-8.9	10.1	1.2	-2.7	.2	-.2
34.	-3.1	-.1	-1.9	4.6		-2.2	1.3
35.	6.6	8.4	-.8	-1.3	-5.0	.5	1.1
36.	13.7	4.0	10.8	-2.4		.7	-3.7
37.	4.7	-5.4	11.3	-.8		2.1	.8
39.	2.9	-2.2	6.4	-.6			.2
40.	-2.6	-13.3	11.9	-2.4	1.0		0
41.	-.7	-7.4	7.8	-1.6	0	1.6	-.2
42.	-1.7	-10.1	9.7	-.9	3.7	-1.0	-.4
43.	3.6	8.0	-3.2	.2	-2.5	-2.7	-.9
43.	1.5	2.6	0	-.4	0	-1.7	1.3
48.	-.7	-7.7	8.1	-.7	1.5	-.7	.1
52.	-5.7	-4.0	-.7	1.8	2.7	-2.0	.9
54.	-5.5	-12.1	5.7	-.8	12.5	0	-1.0
55.	1.9	3.1	0	-.2	.5	-.8	-2.5
56.	0	3.0	-1.9	2.2	-1.3	-1.4	-.2
57.	2.9	.7	3.3	-.5		-1.8	.4

TABLE XXXII

Medians and deviations from medians for average cost per pupil for two years based on the average number of pupils in daily attendance. The figures refer to dollars and tenths of dollars. Thirty cities, reporting for two school years, 1902-03 and 1903-04.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	28.8	20.5	18.3	2.2	1.9	1.6	1.7	1.1
5.	5.9	4.9	6.3	-1.4	.4	0	.7	-.7
6.	-2.8	-1.9	-.9	-1.0	-.3	.1	-.2	.6
8.	3.0	2.5	2.0	.5	0	.3	.1	.1
13.	3.1	2.8	.1	2.7	.1	.1	.4	-.3
14.	0	-.8	-.1	-.8	.2	0	.8	.6
15.	-3.3	-1.9	-1.9	0	-.3	0	-.1	-.4
16.	-.4	.9	.9	0	0	0	0	-.1
20.	-5.7	-3.2	-1.7	-1.6	-.6	-.6	.4	-.4
27.	-2.7	-2.4	-3.5	1.1	.1	0	-.8	-.2
28.	1.0	.3	1.3	-1.0	.3	-.6		
29.	-1.7	-2.7	-1.3	-1.4	.2	.3	-.2	.2
30.	9.2	6.2	7.3	-1.2	.5		0	2.1
31.	.6	1.6	-.2	-1.4	.1		1.6	1.2
32.	2.4	-.2	-1.0	.8	.1	-.7	.3	1.3
34.	4.9	4.7	3.4	-.7	1.3		.7	0
35.	-1.6	.4	1.5	-1.1	-.3		-.1	0
36.	3.0	5.0	1.7	3.2	-.7		.1	-.7
37.	-8.8	-5.3	-6.5	1.3	-.8		-.3	-.4
39.	1.6	2.0	.6	1.4	-.2		.3	.2
40.	4.2	1.9	.5	1.3	-.6	.4	.8	.1
41.	-3.8	-3.0	-3.1	.1	-.7	-.2	0	-.6
42.	0	-3.4	-2.7	2.3	-.4	1.0	-.2	-.2
43.	-.5	0	1.2	-1.2	0	-.7	0	-.3
45.	0	0	1.0	-.9	-.3	.1	-.5	.6
48.	-3.5	-2.9	-3.8	.9	-.4	0	-.2	-.4
52.	-1.1	-3.1	-2.7	-.5	.2	.3	-.6	1.6
54.	22.7	13.3	9.6	3.6	1.0	4.5	.6	-.8
55.	-7.6	-7.2	-6.0	-1.3	-.8	-.5	-.7	-.7
56.	.7	.6	-.2	.8	.6	-.5	-.3	.2
57.	23.1	18.2	15.3	2.9	.8	1.7	.3	1.1

TABLE XXXIII

Medians and deviations from medians for per cent. of total which each item is, based on average for two years. Thirty cities, reporting for the school years 1902-03 and 1903-04. The figures refer to per cents and tenths of per cents.

Number of City.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	70.7	63.1	8.0	6.1	5.7	5.9	3.5
5.	4.7	10.1	-5.8	.6	-.5	1.2	-2.6
6.	.3	3.6	-3.6	-.1	.9	.1	3.0
8.	1.8	.9	.4	-.1	.3	-.2	.1
13.	2.1	-3.7	7.4	.2	-.4	.7	-1.0
14.	-2.3	.3	-3.1	1.3	-.1	2.2	2.4
15.	4.0	2.7	.9	.2	1.0	.3	-.7
16.	4.8	4.8	-.4	.5	-.1	.2	0
20.	3.9	9.1	-5.4	-.8	-1.3	2.7	-.5
27.	-2.6	-7.2	4.6	1.5	1.3	-2.4	.1
28.	-1.0	2.7	-4.1	1.0	-2.3		
29.	-5.0	-.3	-5.0	1.6	1.2	-.3	-1.4
30.	-.2	4.7	-5.4	.2		-1.3	4.8
31.	-6.7	-1.9	-5.3	.5		5.3	4.3
32.	-5.3	-8.8	2.1	.3	-2.9	.4	3.6
34.	-2.1	1.1	-3.6	3.3		.7	-.2
35.	6.0	9.8	-4.2	-.4	-5.4	0	.3
36.	10.1	-.5	9.2	-2.5	-5.0	-.1	-2.3
37.	5.5	-3.9	9.2	-.9		1.0	-.1
39.	3.2	-1.0	3.9	-.7		.6	.6
40.	-2.6	-6.1	3.1	-2.3	.4	1.4	.1
41.	-.7	-2.2	1.1	-1.6	-.1	.8	-1.7
42.	-.9	-9.0	7.7	-.9	3.4	-.8	-.4
43.	1.3	5.6	-4.7	.3	-2.4	0	-.8
45.	.5	3.8	-3.7	-.6	.4	-2.0	2.4
48.	-2.2	-5.7	4.1	-.4	.6	-.3	-.8
52.	-8.3	-6.9	-1.9	.3	1.6	-2.3	6.3
54.	-5.3	-9.1	3.3	-.7	7.5	-1.1	0
55.	-1.5	1.3	-3.2	-.5	.1	-.8	-1.5
56.	.5	-2.2	2.3	2.2	-1.9	-1.5	.9
57.	3.8	1.7	1.7	-1.0		-2.0	.7

There are thirty-six cases in which a positive deviation for one item is accompanied by a negative deviation for the other, and only twenty-one cases where like deviations occur for both items. One might seem justified in declaring that a negative relationship exists. It is not possible from the table to tell how large this negative relationship is, much less to express it in a single significant figure. It is just here that the great value of the Pearson Coefficient of Correlation¹ comes in.

In the next set of tables (see Tables XXXIV and XXXV) the deviations are given as a per cent. of the median. The gross deviations from the median are significant, especially when deviations for different items are compared with each other as indicated above, but the range of variability is better indicated, I believe, by giving the per cent. of the median or other single figure indicating a central tendency. For example, the median for janitors' salaries (first years' figures, per cent. basis) is 6.2 %, and for salaries for teaching and supervision it is 71.2 %. Now, a deviation of .6 % in the case of janitors' salaries seems insignificant when compared with a deviation of 7.1 % for teaching and supervision—the one is almost twelve times the other; but when we remember that each one represents a deviation equivalent to about 10 % of the median, we are nearer recognizing their real significance, I believe, than when we consider them merely in gross. Even this method of comparison is, however, misleading, since it is absolutely impossible for the items "teaching and supervision" or "teaching" to vary as much as 100 % above or below the median when the per cent. of the total is taken as the basis of comparison, because the median for teaching and supervision amounts to 70.7 %, and for teaching to 63.1 % of the total. On the cost per pupil basis, while it is not impossible to have a variation equal to 100 % of the median, or greater, for these larger items, yet, even if such variations occur, they are not comparable to variations which give the same per cent. of the median where this item represents a very much smaller part of the total expenditure.² Even after

¹ The reader not versed in statistical methods is referred to Thorndike's *Mental and Social Measurements* (The Science Press, 1904), where he will find a most satisfactory treatment of this and other statistical methods.

² For discussion of this point, see Thorndike, *Mental and Social Measurements*, pp. 102 and 103.

these qualifications (which show us that we must be on our guard in comparing variabilities for different items) have been made, I am still of the opinion that these tables are very helpful in giving us a correct idea of the variability of all items, as well as permitting us to compare the variability of items whose medians represent about the same proportion of the total or nearly the same cost per pupil.

In Table XXXIV the items which apparently show the least variability are "total," "teaching and supervision," and "teaching." As noted above, any deviation above the median is possible; *i. e.*, the deviation above the median may be 100 % or more of the median. It is striking to note that the deviations expressed as per cents of the median for the total amount spent range from -30.6 % to + 80.2 %; while for teaching and supervision the range is from -35.1 % to + 88.8 %. Apparently the amount paid per child for teaching and supervision is even more variable than the total amount of money spent per child. Possibly this is what we might have expected when we remember that teachers of some sort can be had for almost any salary, while some of the other commodities or utilities which must be had to run the school have a much more definite market value. The great range for supervision from -73.7 % to + 166 % is at least partially to be accounted for, I believe, by the fact that no very clear distinction exists between teachers and supervisors or principals in some systems. Those who should have been reported as teachers are, doubtless, in some instances reported as supervisors, and *vice versa*.

The items "janitors' salaries," "text-books and supplies," and "fuel" furnish the best opportunity for comparison of variability. The medians for these items are respectively \$1.90, \$1.60, and \$1.70. The range of deviations for janitors' salaries is from -42.8 % to + 53.5 % of the median; for text-books and supplies, from -42.7 % to + 274 %; and for fuel, from -40.9 % to 93.6 %. That the smallest proportional plus variation should be found in the item of janitors' salaries, and the largest for the item of text-books and supplies seems to me to indicate that, in some cities at least, more money means more of those things which make possible efficient work in the schools.

The deviations for the item of repairs show a range of from -74.8 % to + 196.6 % of the median. There would probably

TABLE XXXIV

Deviations from the medians; average cost per pupil for two years (see Table XXXII), reduced to per cents of the medians. The figures refer to per cents and tenths of per cents.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	28.8	20.5	18.3	2.2	1.9	1.6	1.7	1.1
5.	20.5	23.9	34.4	-64.5	21.4	0	40.9	-65.5
6.	-9.7	-9.3	-4.9	-46.1	-16.1	6.1	-11.7	56.1
8.	10.4	12.2	10.9	23.1	0	18.3	5.8	9.4
13.	10.8	13.7	.6	124.0	5.4	6.1	23.4	-28.1
14.	0	-3.9	-.6	-36.9	10.7	0	46.8	56.1
15.	-11.5	-9.3	-10.4	0	-16.1	0	-5.8	-37.1
16.	-1.4	4.4	4.9	0	0	0	0	-9.1
20.	-19.8	-15.6	-9.3	-73.7	-32.1	-36.6	23.4	-37.1
27.	-9.4	-11.7	-19.1	50.7	5.4	0	-46.8	-18.1
28.	3.5	1.5	7.1	-46.1	16.1	-36.6		
29.	-5.9	-13.2	-7.1	-64.5	10.7	18.3	-11.7	18.1
30.	32.0	30.2	39.9	-55.3	26.7		0	196.1
31.	2.1	7.8	-1.1	-64.5	5.4		93.6	112.1
32.	8.3	-1.0	-5.5	36.9	5.4	-42.7	17.6	121.1
34.	17.0	22.9	18.6	-32.3	69.5		40.9	
35.	-5.6	1.9	8.2	-50.7	-16.1		-5.8	
36.	10.4	24.4	9.3	148.0	-37.4		5.8	-65.1
37.	-30.6	-25.9	-35.5	59.9	-42.8		-17.6	-37.1
39.	5.6	9.8	3.3	64.5	-10.7		17.6	18.1
40.	14.6	9.3	2.7	59.9	-32.1	24.4	46.8	9.4
41.	-13.2	-14.6	-17.0	4.6	-37.4	-12.2	0	-56.1
42.	0	-16.6	-14.8	106.0	-21.4	61.0	-11.7	-18.1
43.	-1.7	0	6.6	-55.3	0	-42.7	0	-28.1
45.	0	0	5.5	-41.5	-16.1	6.1	-29.2	56.1
48.	-12.2	-14.1	-20.8	41.5	-21.4	0	-11.7	-37.1
52.	-3.8	-15.2	-14.8	23.1	10.7	18.3	-35.1	149.0
54.	78.8	64.9	52.5	166.0	53.5	274.3	35.1	-74.1
55.	-26.4	-35.1	-33.3	-59.9	-42.8	-30.5	-40.9	-65.1
56.	2.4	2.9	1.1	36.9	32.1	-30.5	-17.6	18.1
57.	80.2	88.8	83.6	134.0	42.8	104.0	17.6	102.1

TABLE XXXV

Deviations from the medians; average for two years of per cent. of total which each item is (see Table XXXIII), reduced to per cents of the medians. The figures refer to per cents and tenths of per cents.

Number of City.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	70.7	63.1	8.0	6.1	5.7	5.9	3.5
5.	6.6	16.1	-72.5	9.8	-8.8	20.3	-74.3
6.	.4	5.7	-45.0	-1.6	15.8	1.7	85.8
8.	2.5	1.4	5.0	-1.6	5.3	-3.4	2.9
13.	3.0	-5.9	92.5	3.3	-7.0	11.8	-28.6
14.	-3.2	.5	-38.8	21.4	-1.8	37.3	68.6
15.	5.7	4.3	11.2	3.3	17.6	5.1	-20.1
16.	6.8	7.6	-5.0	8.2	-1.8	3.4	0
20.	5.5	14.4	-67.7	-13.2	-22.8	45.8	-14.3
27.	-3.7	-11.4	57.7	24.6	22.8	-40.7	2.9
28.	-1.4	4.3	-51.2	16.4	-40.4		
29.	-7.1	-.5	-62.5	26.3	21.1	-5.1	-40.1
30.	-.3	7.4	-67.7	3.3		-22.0	137.2
31.	-9.5	-3.0	-66.2	8.2		89.8	122.7
32.	-6.5	-13.9	26.2	4.9	-50.9	6.8	102.8
34.	-3.0	1.7	-45.0	54.1		11.9	-5.7
35.	8.5	15.5	-52.5	-6.6	-94.8	0	8.6
36.	14.3	-.8	115.0	-41.0	-87.8	-1.7	-65.7
37.	7.8	-6.2	115.0	-14.8		17.0	-2.9
39.	4.5	-1.6	48.7	-11.5		10.2	17.2
40.	-3.7	-9.7	38.8	-37.7	7.0	23.7	2.9
41.	-.9	-3.5	13.7	-26.2	-1.8	13.6	-48.6
42.	-1.3	-14.3	96.2	-14.8	59.7	-13.6	-11.5
43.	1.8	8.9	-58.7	4.9	-42.2	0	-22.9
45.	.7	6.0	-46.2	-9.9	7.0	-33.9	68.6
48.	-3.1	-9.0	51.2	-6.6	10.6	-5.1	-22.9
52.	-11.7	-10.9	-23.7	4.9	28.1	-39.0	179.8
54.	-7.5	-14.4	41.2	-11.5	132.6	-18.8	0
55.	-2.1	2.1	-40.0	-8.2	1.8	-13.6	-42.9
56.	.7	-3.5	28.7	36.1	-33.3	-25.4	25.7
57.	5.4	2.7	21.2	-16.4		-33.9	20.1

be less variability in this item if we had the figures for a period of five or ten years, instead of only two years' figures.

Table XXXV, which gives the deviations from the medians on the per cent. basis (the average for two years, see Table XXXIII) reduced to per cent. of the median, offers another interesting view of the variability. When we ask how a city spends its money regardless of the amount of money which it has to spend, we are dealing with the problem which every administrator of schools must face. From a median of 70.7 % spent for teaching and supervision, we find that the variations range from -11.7 % to +14.3 % of that proportion, while the deviations for teaching alone amount to from -14.4 % to +16.1 %. In these, and in the other items given in this table, we find a smaller range than is found for the same items on the cost per pupil basis. This means, of course, that amount of money per pupil available for maintenance and operation of schools varies much more than does the proportional distribution of that money.

On the basis used in this table, as well as on the cost per pupil basis, we find that the range above the median is less for janitors' salaries than for fuel or text-books and supplies—that of the three, text-books and supplies show the greatest range. The range for janitors' salaries is from -41 % to +54.1 % of the median; for fuel, from -40.7 % to +89.8 %; for text-books and supplies, from -94.8 % to +131.6 %. In a later section, where the relationship of these items to the total is worked out exactly, the item of text-books and supplies is shown to be more closely correlated with the total amount spent than are either of the other items.

As a conclusion to the discussion of variability, it may not be out of place to suggest certain limits within which, in my judgment, the cost per pupil or per cent. of total amount spent for each item should lie. Allowing for some difference in the cost of living, it seems to me that the superintendent of schools in any city spending less than \$30 per pupil for the maintenance and operation of schools, should investigate in order to find out whether the schools are getting their just proportion of the money spent by the city. This amount seems small when compared with the rates of tuition charged to day pupils in our best private schools where the tuition even in the lower grades is

commonly \$100 to \$200 per year. It is difficult to place the upper limit for the total cost per pupil, except by saying that the expenditure should be increased to such an extent that the public schools shall be able to do as efficient work as our best private schools. When we compare the meagre provision which was made for public education fifty years ago with an expenditure of \$54 per pupil reported by one of the cities with which this study deals, we are inclined to feel hopeful for the future. If the superintendent of schools, or other school officer, has seen to it that as much money as possible is provided for the public schools, his next problem is to apportion the money secured among the several items of the budget to the best possible advantage. From the data given above, it is my judgment that an ideal budget would give to each of the principal items not less than the first proportion mentioned in the table below, nor more than that indicated by the last figure, except that cities spending an unusually large amount per pupil should, I believe, spend a relatively larger proportion for teaching and supervision, and for text-books and supplies; while the proportion spent for fuel, repairs, and janitors' salaries should increase much more slowly.

TABLE XXXVI

	% of Total.		% of Total.	
Teaching and Supervision	from	70 %	to	75 %
Supervision alone	"	7 %	"	10 %
Teaching alone	"	60 %	"	68 %
Janitors' Salaries	"	5 %	"	7 %
Text-Books and Supplies	"	4 %	"	6 %
Fuel	"	5 %	"	7 %
Repairs	"	3 %	"	5 %

Teaching and supervision are the most important factors in an effective school system and should, in my opinion, receive a greater rather than a smaller proportion than that usually given. The limits given for supervision are high rather than low, I think. There is a tendency to-day, I believe, to differentiate the work of the supervisor of instruction from that of the class teacher on the one hand, and, on the other, from the mere routine work of the assistant who keeps the office records. This means that a competent supervising principal can do the work of supervision formerly done by five or six men; and that even though he receives a larger salary than was paid any one of the five or six before, the proportion paid for supervision,

even when office clerks' salaries are included, has diminished. Janitors' salaries, fuel, and repairs are fixed charges upon the school revenue, which should not much increase in proportion to the amount per pupil available for school purposes.

The best way to decide just what is the best way to apportion the money among the various items of the budget would be to find out which school system is doing the best work, by testing the pupils in the system, and then to adopt as the ideal apportionment that distribution of moneys which is found in the most efficient school systems. I hope that some one will be able to make such tests within the next year for the cities from which the data were secured for this study.

RELATIONSHIPS

In the discussion of variability given above, it was suggested that a more careful study of the data given would enable us to measure exactly the relationships which exist among the various items of the budget. Such questions of relationship naturally suggest themselves when one considers the distribution of money for different purposes. Do cities which spend a large total amount per pupil spend a correspondingly large amount for teaching? As the amount per pupil increases, is more money spent for every purpose, or are there certain items of expense which do not increase in proportion to the increased cost per pupil? What is the relation between a large amount of money spent for supervision and the amount spent for text-books and supplies, fuel, repairs, etc.? If a larger proportion than usual of the money available for school purposes is spent for janitors' salaries, what effect may we expect this to have upon teachers' salaries? These and many other similar questions can be answered by determining the relationships which exist among the various items of the budget, on both the cost per pupil and per cent. of total bases.

From the tables of deviations of medians given above (Tables XXVIII to XXXIII), the fact that relationships exist might, perhaps, be inferred, but no one could from such large tables of details infer the particular relationships which do actually exist. It is just here that the Pearson Coefficient of Correlation is invaluable. The following explanations, adapted from Thorndike's *Educational Psychology* (page 26), will explain the

meaning of the coefficient of correlation to the reader not already familiar with its use.

"The coefficient of correlation is a simple figure so calculated from the several records as to give the degree of relationship between any two items which will best account for all the separate cases in the group. In other words, it expresses the degree of relationship from which the actual cases might have arisen with least improbability. It has possible values from + 100 per cent. through 0 to - 100 per cent."

A coefficient of correlation of + 100 % between two items of the budget (say teachers' salaries and text-books) on the basis of the cost per pupil would indicate that the city which spent the most for teachers' salaries, spent the most for text-books; that the city which spent the least for teachers' salaries, spent the least for text-books; that if the cities were ranged in order according to the amount spent for teachers' salaries, and then in order according to the amount spent for text-books, the two rankings would be identical; that the position of any city with reference to the others for one item will be the same for the other item (both being reduced to terms of the variabilities of the cost per pupil as units to allow comparison).

A coefficient of - 100 % would, *per contra*, mean that the city which spent most for one item would spend the smallest amount for the other, that any degree above the average or median in the one would be accompanied by the same degree below the average or median for the other, and *vice versa*. A coefficient of + 62 % would mean that (comparison being rendered fair here, as always, by reduction to the variabilities as units) any given station for one item would, on the whole, imply 62 hundredths of that station for the other. A coefficient of - 62 % would, of course, mean that any position above the average for the one item would, on the whole, involve a position below the average for the other item equal to 62 hundredths of the amount the first was above the average.

Table XXXVII gives the coefficients which were found on the cost per pupil basis. The first column gives the corrected coefficient¹ as determined from the coefficients found when the

¹ This correction is made by using the Spearman formulæ for the correction of the Pearson Coefficient. See *American Journal of Psychology* for January, 1904.

TABLE XXXVII

PEARSON COEFFICIENTS OF CORRELATION CALCULATED ON THE COST PER PUPIL BASIS.

	Corrected Co-efficient (Spearman formulae used).	Coefficient derived from the average of the first and second years' figures (30 cities).	Coefficient derived from first years' figures for cities reporting two years (30 cities).	Coefficient derived from second year's figures (30 cities).	Coefficient derived from first year's figures for all cities reporting (88 cities).
Total Cost per Pupil correlated with Teaching and Supervision	+1.015 ¹	+.97	+.96	+.99	+.88
Total Cost per Pupil correlated with Janitors' Salaries	+.716	+.66	+.70	+.56	+.73
Total Cost per Pupil correlated with Text-Books and Supplies	+.955	+.85	+.85	+.67	+.64
Total Cost per Pupil correlated with Fuel	+.522 ²	+.45	+.50	+.34	+.40
Total Cost per Pupil correlated with Repairs	+.246	+.24	+.47	+.56	+.35
Teaching and Supervision correlated with Janitors' Salaries	+.746	+.64	+.63	+.44	+.53
Teaching correlated with Text-Books and Supplies	+.737	+.63	+.76	+.35	+.65
Supervision correlated with Text-Books and Supplies	+.869	+.69	+.57	+.51	+.27
Supervision correlated with Repairs	-.128	-.14	+.18	-.09	+.07
Supervision correlated with Teaching	+.366	+.27	+.31	+.05	+.12
Supervision correlated with Fuel	+.11	+.06	+.02	+.04	+.01
Janitors' Salaries correlated with Fuel	+.531	+.30	+.61	-.08	+.45
Janitors' Salaries correlated with Repairs	+.219	+.32	+.32	+.39	+.24
Repairs correlated with Fuel ..	+.147	+.12	+.21	-.001	+.20

¹ That this coefficient as corrected gives over 100 % is due to the fact that the third decimal place is lacking in the coefficients from which the correction was made.

² The item "fuel" as reported for the two years is less definite than most of the other items, because fuel bought, or at least fuel paid for, one year is often used the next year; consequently, only the second method given by Spearman for the correction of the Pearson coefficient is used. This method is based on the fact that an increase in the number of measures of each of the facts originally measured increases its accuracy.

first year's figures alone were used, when the second year's figures alone were used, and when the average for the two years was used (see columns 3, 4, and 2). The second column gives the coefficients derived from the average of two years' figures; the third, the coefficients derived from the first year's figures from cities reporting two years; the fourth, the coefficients derived from the second year's figures; and the fifth, the coefficients found when the figures for the fifty-eight cities reporting the first year were used.

In the discussion which follows, the coefficients referred to are always the corrected coefficients, unless it is specifically stated that other coefficients are meant. I believe that the corrected coefficient more nearly expresses the relationship which actually exists among the various items correlated than does any other figure.¹

The first question which our coefficients enable us to answer concerns the relationship of the total cost per pupil to the principal items of the budget. Does an increased cost per pupil mean a proportionate increase in the amount spent for teaching and supervision, for janitors' salaries, for text-books and supplies, for fuel, and for repairs; or is the relationship between the total cost per pupil and the various items of the budget closer for some than for others? Examining our coefficients we find that the relationship between the total cost per pupil and the cost for teaching and supervision is expressed by a coefficient of + 100 % (see explanation under Table XXVII), *i. e.*, the amount spent for teaching and supervision is determined by the total amount spent per pupil. If a small total amount per

¹ The true relationship between any two items in the budget for these cities is the relationship which would be found if we had perfect measures of the cities' tendencies to spend money for school; such, for instance, as their budgets for forty or fifty years. The effect of chance deviations of any single year from the cities' general tendencies is to bring the calculated correlation from its true value toward zero. By the Spearman formulæ we estimate the true relationship (1) from the obtained relationship and the amount of deviation of one year's budget from another year's, or (2) from the difference between the relationship obtained from one year's budget and that from two or more years' budgets. For the theory of the correction see, in general, Thorndike, *Mental and Social Measurements*, pp. 128 and 129, and in detail C. Spearman, on "The Proof and Measurement of Association between Two Things," *American Journal of Psychology*, January, 1904.

pupil is spent, we may expect a correspondingly small amount per pupil for teaching and supervision; if a large total amount per pupil is spent, we may expect a correspondingly large amount per pupil for teaching and supervision; if the cities were ranked in order on the basis of total amount spent per pupil, and then in order on the basis of the amount spent per pupil for teaching and supervision, we would expect to find that the rank of the cities would be the same for each item. The next closest relationship is that for text-books and supplies, which gives a coefficient of $+ .955$. The others are, in order, janitors' salaries, $+ .716$; fuel, $+ .522$; and repairs, $+ .246$. In general, these relationships show that the amount spent per pupil for teaching and supervision, and for text-books and supplies, corresponds very closely to the total amount spent per pupil; if the cost per pupil is above the average, we may expect that the amount spent per pupil will be high for these items, and any diminution in the total amount spent per pupil is likely to be accompanied by a smaller expenditure per pupil for these purposes.

The coefficients found for janitors' salaries and fuel show a less close correspondence. From the relationship here we may infer that the rank of any city above or below the median in total cost per pupil might be compatible with various ranks for janitors' salaries or fuel, which would tend to be approximately three fourths of the rank in total cost per pupil.

The item of repairs is least closely related with the total cost per pupil. This is as we might have expected. The fact that a school system is expensive does not increase the cost of repairing the buildings, except in so far as the labor necessary to do the work may cost more in those cities which are able to spend the large amount per pupil. We might expect the expensive city to keep its buildings in better repair than the poorer cities, which, with the difference in the cost of labor mentioned above, would seem to account for the coefficient of $+ .246$.

The fact that we find a direct relationship between the total cost per pupil and the cost per pupil for each of the principal items of expenditure makes it clear that, in general, an expensive school system is expensive because it spends more money for everything, and that an inexpensive school system is one that retrenches all along the line. However, the fact that certain of the items are less closely related to the total cost per

pupil than others does indicate that these items will probably not be found to increase or decrease in a proportion equal to that of the items showing a closer relationship, nor in proportion to the increase in the total cost per pupil.

Table XXXVIII shows just how an increased or a decreased total cost per pupil affects the principal items of the budget. The figures given refer to dollars, and are calculated from the average amount spent for each item for two years. The data are from thirty cities reporting for the school years 1902-1903 and 1903-1904.

TABLE XXXVIII

	Total Cost per Pupil.	Teachers' Salaries.	Supervision.	Teaching and Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Average for the five cities nearest the median.....	\$29.00	\$17.80	\$2.20	\$20.00	\$1.90	\$1.80	\$1.90	\$1.60
First group of five cities above the median group.....	31.00	19.20	3.20	22.40	1.80	1.30	1.90	1.30
Second group of five cities.....	34.10	21.80	2.30	24.10	2.20	1.80	2.20	1.30
Three cities having the greatest expense per pupil.....	51.70	30.80	5.40	36.20	2.80	4.80	2.20	2.00
Average for the five cities nearest the median.....	29.00	17.80	2.20	20.00	1.90	1.80	1.90	1.60
First group of five cities below the median.....	27.70	18.20	1.30	19.50	1.90	1.60	1.50	1.30
Second group of five cities.....	25.50	15.70	2.40	18.10	1.50	1.60	1.40	.90
Three cities having the smallest expense per pupil.....	20.80	13.60	1.60	15.20	1.10	1.10	1.50	.60

EXPLANATION OF TABLE XXXVIII

The first line of the table gives the average total cost per pupil and the average amount spent for each of the principal items of the budget, for the five cities which have a total cost per pupil nearest the median total cost per pupil. The next line gives the same information for the group of five cities having the next highest total cost per pupil. The next two

lines are explained in like manner. The fifth line repeats the first line. The sixth line gives the average total cost per pupil and the average expenditure for the several items of expenditure for the five cities which have the next lowest total cost per pupil below the median group. The next two lines are explained in like manner.

From this table (XXXVIII) the relationships already shown by the coefficients of correlation given in Table XXXVII are made clear. In general, the table shows that an increased cost per pupil means an increased expenditure for each item, and that a decreased total cost per pupil is accompanied by a decrease in the amount spent per pupil for everything. An increase of two dollars in the total cost per pupil (see line 2) is accompanied by an increase of \$2.40 per pupil in amount spent for teaching and supervision, and a decrease in janitors' salaries, text-books and supplies, and repairs, while fuel remains the same. In the next group, however, with an increase in total cost per pupil above the median group of \$5.10, teaching and supervision show an increase of \$4.10, janitors' salaries and fuel show an increase of thirty cents each, text-books and supplies remain the same, and repairs decrease thirty cents per pupil. The next group, with an increased total cost per pupil of \$22.70, gives an increase for teaching and supervision of \$16.20, an increase for janitors' salaries of ninety cents, an increase for text-books and supplies of \$3, an increase for fuel of thirty cents, and an increase for repairs of forty cents per pupil.

By examining the part of the table giving the expenditures for groups of cities spending less than the median group, we find the decrease in all items more constant than was the increase for the cities spending more than was spent by the median group. The very fact that the city spends less than the average probably means that it would be very difficult to keep the expenditure in any one item up to the average without eliminating other necessary expenditures. On the other hand, a city spending more than the average can put the additional money in any place where the demand, of one kind or another, may be strongest.

Let us return again to a consideration of the relationships given in Table XXXVII. The relationship (+.746) between teaching and supervision and janitors' salaries tends to confirm

the observation made above with reference to the relation between these items and the total cost per pupil. We may not expect janitors' salaries to correspond so closely to the total cost per pupil as do teachers' salaries. Apparently there are causes other than those (the cost per pupil of teaching and supervision) which influence the amount per pupil spent for janitors' salaries.

The coefficients for teaching and for supervision with text-books and supplies (+.737 and +.869, respectively), indicate a closer relationship between the cost per pupil for supervision and for text-books and supplies than exists between the cost per pupil for teaching and for text-books and supplies.

That the relationship between supervision and repairs is negative (-.128) might seem to imply that high-priced supervision means better care of buildings. The coefficient of supervision correlated with teachers' salaries is +.366. This is rather smaller than one might have expected. It is rather natural to suppose that high-priced supervisors would want high-priced teachers, and that a city spending a large amount per pupil for teachers would spend a correspondingly large amount for supervision. The small coefficient found for supervision correlated with fuel (+.11), seems to indicate that while greater expense for supervisors increases the amount spent for text-books and supplies (see coefficient for supervision with text-books and supplies), it has little in common with the expense for fuel.

The relationship between janitors' salaries and fuel, and janitors' salaries and repairs, is expressed by coefficients of +.531 and +.219, respectively. It will be remembered that fuel is more closely correlated with the total cost per pupil than is janitors' salaries. This being true, it would seem that the correspondence between janitors' salaries and fuel might be accounted for by the fact that they are both determined largely by the total amount spent per pupil. It was found also that supervision and repairs show a negative relationship, and here we find a positive relationship between janitors' salaries and repairs nearly equal to the relationship between repairs and the total cost per pupil. Apparently costly supervision means more for economy in repairs than does a large amount per pupil spent for janitors' salaries.

The next table (No. XXXIX) gives the coefficients which were calculated on the "per cent. of total" basis.

These coefficients show what effect the spending of a certain proportion of the money available for one item has on the proportion spent for other items.

TABLE XXXIX

PEARSON COEFFICIENTS OF CORRELATION CALCULATED ON THE PER CENT. OF TOTAL BASIS.

	Corrected Coefficient (Spearman formula used).	Coefficient derived from the average of first and second years' figures (30 cities).	Coefficient derived from first year's figures for cities re- porting two years' figures (30 cities).	Coefficient derived from second year's figures (30 cities).	Coefficient derived from first year's figures for all cities reporting (38 cities).
Teaching and Supervision correlated with Janitors' Salaries.....	-.356	-.30	-.25	-.43	-.48
Teaching correlated with Text- Books and Supplies.....	-.746	-.46	-.09	-.59	-.12
Janitors' Salaries correlated with Fuel.....	-.024	-.03	+.12	-.33	+.26
Janitors' Salaries correlated with Repairs.....	+.155	+.17	+.12	+.48	+.13
Supervision correlated with Text-Books and Supplies...	+.203	+.17	+.17	+.27	+.01
Supervision correlated with Repairs.....	-.409	-.28	-.06	-.38	+.03
Supervision correlated with Teaching.....	-.983	-.68	-.54	-.69	-.67
Supervision correlated with Fuel.....	-.333	-.20	-.17	-.03	-.02
Repairs correlated with Fuel..	+.195	-.03	+.003	+.12	+.23

In this table (XXXIX) the significant thing is not so much the size of the positive or negative coefficients as the order, the *relative* closeness of relationship or opposition among the various items. Rearranging the table on this basis and calling the median relationship zero, and transmuting the others on this basis, the following table is derived:

	Transmuted Coefficients.	
Supervision correlated with Teaching.....	-.983	-.650
Teaching " " Text-Books and Supplies ..	-.746	-.413
Supervision " " Repairs.....	-.409	-.076
Teaching and Supervision correlated with Janitors' Salaries.....	-.356	-.023
Supervision correlated with Fuel.....	-.333	0
Janitors' Salaries correlated with Fuel.....	-.024	+.309
" " " Repairs.....	+.155	+.488
Repairs correlated with Fuel.....	+.195	+.528
Supervision correlated with Text-Books and Supplies ..	+.203	+.536

I believe that the transmuted coefficients more nearly express the true relationship than do those originally found, for we must have expected a negative relationship between any two items, because a larger proportion than usual spent for one item leaves a smaller proportion of the total to be divided among the other items of the budget. So far as the coefficients obtained enable us to judge, this negative relationship, due simply to the fact that a larger proportion of money than usual spent for any one item leaves a smaller proportion for other items, is approximately the relationship half-way between the extremes,—the relationship between supervision and fuel, $-.333$. If we call this relationship zero, the transmuted relationships give us, as nearly as we can obtain them, the relationships between the other items freed from this constant error.

Let us consider the transmuted coefficients. Suppose a city spends more than the usual proportion for supervision, what other items may we expect to find receiving an unusual proportion of the money spent? The coefficient of $+.536$ between supervision and text-books and supplies indicates that the probability is that a city which spends a large proportion for one of these items will spend a large proportion for the other,—that we may expect to find some cities unusual both in respect to the proportion spent for supervision and that spent for text-books and supplies. The positive coefficients between janitors' salaries, fuel, and repairs, no matter which two are taken together, shows that in cities where one of these items is proportionately large, the others will probably receive more than the usual proportion. Comparing these coefficients with those found for teaching and supervision with janitors' salaries and supervision with fuel, it is suggested that some boards of education are interested particularly in the physical side—the buildings, their care, etc.,—and that this over-emphasis on this side means less money for the purely educational activities. The very large negative coefficient for supervision correlated with teachers' salaries would doubtless be reduced if more accurate reports of the amounts spent for each of these items were available. It is in this relationship between the two items that any mistakes in reporting in either an amount which really belonged to the other would be most apparent. Any amount reported as teaching which should have been given as supervi-

sion would make the amount for teaching too large and the amount for supervision too small, and the opposite would be true if an amount which should have been reported as teaching were given as supervision. In either case, such mistakes would make this particular coefficient show a more pronounced negative relationship than actually exists. Such mistakes would not, however, have a like effect on other coefficients, where the increase or decrease in the item of supervision or teaching has no effect on the other item correlated. The fact that the amounts given for teaching or supervision may in one case be slightly too large and in another slightly too small, means that, except when the two items themselves are correlated, the mistake in one direction would be offset by the mistake in the other.

The relationship between teachers' salaries and text-books and supplies ($-.413$) is particularly interesting when contrasted with the relationship between supervision and text-books and supplies ($+.536$). If a city spends an undue proportion for supervision we may expect that an unusually large proportion will be spent for text-books and supplies; while the opposite condition holds for the proportion spent for teaching. Possibly the relationship between supervision and text-books and supplies is simply that the highly paid supervisors are able to get appropriations for books and supplies, and that poorly paid supervisors do not have the ability or influence, rather than that the supervisors have much to do with the actual use or waste of supplies furnished. On the other hand, if there is anything that a good teacher wants, it is plenty of books and supplies of the right quality, consequently it seems strange that there should be this opposition in the relative proportions spent for these two items. However, expensive teachers may effect economy by the proper use of materials, and poorly paid teachers may be the most careless. There is nothing that hurts a book so little as using it properly, and it is conceivable that the best teachers may actually use fewer supplies than those with less ability.

Table XL gives the correlation of the first and second years' figures on both the cost per pupil and per cent. of total bases. These coefficients give us some idea of the relative stability of the various items of the budget. They are used also in making the Spearman correction.

TABLE XL

First and second year's figures correlated. Thirty cities reporting for the school years 1902-03 and 1903-04.

I—COST PER PUPIL BASIS

Total cost per pupil correlated with total cost per pupil.....	+	.92
Supervision and teaching correlated with supervision and teaching	+	.89
Supervision " " supervision.....	+	.69
Teachers' salaries " " teachers' salaries.....	+	.79
Janitors' " " janitors' "	+	.90
Text-books and supplies " " text-books and supplies..	+	.89
Fuel " " fuel.....	+	.17
Repairs " " repairs.....	+	.34

II—PER CENT. OF TOTAL BASIS

Supervision and teaching correlated with supervision and teaching	+	.56
Supervision " " supervision.....	+	.58
Teachers' salaries " " teachers' salaries.....	+	.51
Janitors' " " janitors' "	+	.80
Text-books and supplies " " text-books and supplies..	+	.65
Fuel " " fuel.....	+	.34
Repairs " " repairs.....	+	.54

The total cost per pupil gives a coefficient of + .92, showing that the amount per child spent does not vary much from year to year,—the expensive city remains so, and the city spending little does not suddenly devote a much larger proportion of its revenues for schools. Almost as constant as the total cost per pupil are the amounts spent for janitors' salaries, text-books and supplies, teaching and supervision, giving, as they do, coefficients of + .90, + .89, + .89, respectively. The items of teaching and supervision, when taken alone, show greater variation (coefficients of + .79 and + .69, respectively), due largely to the fact that, in reporting, amounts properly belonging to one item were reported under the other, rather than in a change of policy as to the relative amount to be allowed for teaching and for supervision.

As one might expect, the amount spent for repairs varies more than any of the items mentioned above (a coefficient of + .34 was found). A large amount spent for repairs one year means a smaller amount the next year, rather than an equally large amount. That the coefficient for fuel is as low as + .17, might seem to indicate that fuel in excess of that which is used is often bought and paid for out of a single year's budget, rather

than that there is any very great difference in the value of the fuel actually consumed each year.

When we come to consider the proportion of the total which is spent for any one item for two successive years, we find the variability rather greater than for the amount spent per pupil. This is due to the fact that, while the amount per pupil spent for any one purpose remains fairly constant, any additional expenditure for some new item which increases the gross amount spent, or any diminution in any item of expenditure, affects the proportion which this item is of the total amount spent. It is interesting to note that in the relative constancy with which a given proportion is spent for any item, janitors' salaries lead, followed by text-books and supplies, supervision, teaching and supervision, repairs, teaching, and fuel (see part II of Table XL).

Table XLI gives the coefficients for the total cost per pupil correlated with the per cent. which each item is of the total. These coefficients tell us what effect a larger or smaller expenditure per pupil may be expected to have on the proportion which is spent for any one item of the budget.

TABLE XLI

PEARSON COEFFICIENTS OF CORRELATION

The total cost per pupil correlated with the per cent. which each item is of the total. The average cost per pupil and per cent. of total for two years is used as the basis of calculation.

Total cost per pupil correlated with per cent. of total spent for:

Teaching and Supervision.....	-.05
Janitors' Salaries.....	-.06
Text-Books and Supplies.....	+.35
Fuel.....	-.22
Repairs.....	+.13

Apparently the total cost per pupil may not be expected to affect the proportion spent for teaching and supervision and for janitors' salaries. Cities spending a large amount per pupil do not necessarily spend any greater proportion of their money for these purposes than do cities spending a smaller amount per child. (The coefficients of $-.05$ and $-.06$ are so small as to be practically negligible.) On the other hand, the positive co-

efficient of $+ .35$ for text-books and supplies indicates that there is a direct relationship between the total amount spent per pupil and the proportion which is spent for this purpose. We may expect an expensive city to spend a larger proportion of its money for text-books and supplies than does the poorer city, even though we may infer from this coefficient that the increase in the proportion spent for this purpose will not be proportionate to the increased cost per pupil. The negative coefficient for fuel shows that the proportion spent for fuel decreases as the total cost per pupil increases. The most expensive city will probably spend a smaller proportion of its money for fuel than a poor city. That the proportion spent for repairs should give a positive coefficient of $+ .13$ when correlated with the total cost per pupil seems to indicate that there is some tendency for the more expensive cities to spend a larger proportion for repairs than the less expensive city—possibly the cities spending the greater amount per pupil do keep their buildings in better repair.

Table XLII gives the average salary received by elementary and by high school teachers, and the average daily wage received by carpenters, bricklayers, and day laborers. This information was calculated from two years' data for the thirty cities reporting for the school years 1902-1903 and 1903-1904. The figure given for elementary and high school teachers' salaries was derived by finding first the average salary paid to each class of teachers for each year separately by dividing the gross amount spent for each item by the number of teachers (see form sent to superintendents), and then the average for the two years was taken. In a similar manner, from the report given by city superintendents on the blank filled out by them, the average wage of carpenters, bricklayers, and day laborers was calculated. The information concerning the daily wage of carpenters, bricklayers, and day laborers is probably less exact than we might wish, but sufficiently accurate, I think, to show whether or not any relationship exists between the amounts paid to this class of laborers and to teachers. It is for the purpose last mentioned that these data are given. Coefficients will be given to show what relationship exists between the wages paid carpenters, bricklayers, and day laborers and the salaries paid teachers.

TABLE XLII

No. of City.	Average High School Teachers' Salary.	Average Elementary School Teachers' Salary.	Average Daily Wage of Carpenters.	Average Daily Wage of Bricklayers.	Average Daily Wage of Day Laborers.
5.	\$ 955.5	\$643.1	—	—	—
6.	747.1	407.5	\$2.50	\$3.25	\$1.75
8.	836.4	691.6	2.50	4.00	2.00
13.	930.	540.8	2.62	3.75	1.75
14.	820.8	425.9	3.00	4.50	2.00
15.	747.9	528.2	3.00	4.00	1.87
16.	770.5	386.4	3.12	3.68	1.50
20.	736.8	537.2	2.75	4.00	2.50
27.	563.3	350.6	—	—	—
28.	931.2	460.4	2.75	3.50	1.50
29.	760.9	452.5	2.50	3.25	1.75
30.	1,332.8	574.	3.50	4.65	2.25
31.	877.6	373.6	2.50	3.50	1.62
32.	801.8	538.1	3.25	4.25	2.00
34.	819.7	513.2	2.50	3.00	1.50
35.	702.8	482.5	3.00	4.00	1.50
36.	603.3	487.5	3.87	3.50	1.50
37.	657.1	381.7	2.90	4.00	1.85
39.	724.9	418.1	2.50	3.25	1.50
40.	732.9	366.2	2.50	2.50	1.50
41.	663.2	429.1	2.75	4.50	1.75
42.	776.5	486.1	2.62	3.30	1.50
43.	805.4	499.	2.60	3.55	1.75
45.	835.8	504.1	2.62	4.00	1.93
48.	558.	415.2	3.00	3.75	1.50
52.	876.7	594.5	2.85	4.00	1.50
54.	884.2	557.5	3.37	4.25	1.75
55.	645.8	399.6	2.75	3.50	1.50
56.	887.5	557.	3.50	3.67	2.45
57.	1,124.1	662.7	3.50	4.70	2.25

Before we give the coefficients showing the relationship between teachers' salaries and the wages paid carpenters, bricklayers, and day laborers, it is interesting to note the variability in teachers' salaries, as shown by the table given above. The average salary of the elementary school teachers varies from \$350.60 in city No. 27 to \$691.30—almost twice as much—in city No. 8. The average salary paid high school teachers varies from \$558 in city No. 48 to \$1,332.80—almost two and a half times as much—in city No. 30. Whatever we may believe about the difference in the cost of living, no one would be willing to maintain that the cost of living in one of the cities is

double that in another of those covered by this study. In no case does the highest daily wage paid a carpenter, bricklayer, or day laborer, as reported, equal double that paid to the poorest paid laborer in any one of these occupations.

TABLE XLIII

PEARSON COEFFICIENTS OF CORRELATION

Salaries of teachers correlated with the daily wages of carpenters, bricklayers, and day laborers. The average salary of teachers and the average daily wage for two years are used as the basis of calculation.

Elementary Teachers' Salaries correlated with:

Carpenters' Wages.....	+.28
Bricklayers' Wages.....	+.44
Day Laborers' Wages.....	+.57

High School Teachers' Salaries correlated with:

Carpenters' Wages.....	+.25
Bricklayers' Wages.....	+.41
Day Laborers' Wages.....	+.57

High School Teachers' Salaries correlated with Elementary Teachers Salaries.....

+.63

The coefficients given above show an increased direct relationship between teachers' salaries and the daily wages paid artisans and day laborers as we go from carpenters, to bricklayers, to day laborers. If the wages paid to day laborers are an index of the cost of living, we may infer that cost of living does enter as a determining factor in the amount paid to teachers; not that the amount of salary paid to the teacher corresponds exactly to the cost of living, but that the tendency will be for cities where living is high to pay rather more than the average salary, and for cities where the cost of living is below the average, to pay its teachers less than the average.

TABLE XLIV

Coefficients of correlation calculated on the cost per pupil basis, the figure used in finding the cost per pupil being half-way between the average number of pupils in daily attendance and the average daily enrollment. Forty-nine cities, reporting for the year 1902-1903.

Total cost per pupil correlated with	Teaching and Supervision..	+.93
" " " " " "	Janitors' Salaries	+.82
" " " " " "	Text-Books and Supplies ..	+.71
Teaching and Supervision "	Janitors' Salaries.....	+.65
Teaching " "	Text-Books and Supplies ..	+.66
Supervision " "	" " " " " "	+.34
" " " " " "	Repairs.....	+.15
" " " " " "	Teaching.....	+.15
Janitors' Salaries " "	Fuel.....	+.45
" " " " " "	Repairs.....	+.40

If these coefficients are compared with those given for the first year's figures in Table XXXVII, they will be found to agree in the main with them. Whatever variation is found is due largely to the fact that on the basis on which this table is computed, nine cities had to be omitted because they did not furnish the necessary data for the average daily enrolment.

Table XLV, which follows, shows the relation between the proportion of pupils attending elementary and high schools, and the proportion of the total amount spent for salaries which is used for the salaries of the two classes of teachers. The table also gives the number of students enrolled per teacher, which offers another basis for comparison as between elementary and high school teachers. The number of pupils as given in this table is in every case the average as found from two years' total enrolment figures. In determining the number of teachers, and in determining the amount of money spent for each group, kindergarten teachers and teachers of special subjects, such as nature study, manual training, etc., are counted as elementary school teachers.

EXPLANATION OF TABLE XLV

The first column gives the average total number of pupils enrolled in all day schools; the second, the number enrolled in elementary schools, including kindergartens; the third, the number enrolled in high schools. The fourth, fifth, and sixth columns give total amount spent for all day school teachers' salaries, the amount spent for elementary school teachers' salaries, including the salaries of kindergarten and special teachers, and the amount spent for high school teachers' salaries, respectively. The seventh and eighth columns give the per cent. of the total number of pupils enrolled who are enrolled in the elementary school, and the per cent. of the total amount spent for teachers' salaries which is spent for the salaries of elementary school teachers. The ninth and tenth columns give the same information for high schools. The eleventh and twelfth columns give the number of pupils enrolled per teacher in both elementary and high schools.

The proportion of the total expenditures, or of the amount spent for salaries, which is spent for the teachers of one class or the other has little significance, except as we are able to compare it with the proportion of the total number of pupils which are enrolled in each class of school. That a city spends 18 % of the total amount spent for maintenance and operation for high school teachers' salaries means one thing when the city enrolls

17 % of its total number of pupils in high schools, and quite another thing when the city enrolls 8.5 % of the total number in high schools.

The number of pupils enrolled in the elementary schools varies from 71 % to 96 % of the total number of pupils enrolled, while the money spent for the salaries of elementary school teachers varies from 56 % to 91 % of the total amount spent for salaries of day school teachers. The median for elementary teachers' salaries is 78.8 % of the total amount spent for salaries, while the median for the enrolment in elementary schools is 90.1 % of the total enrolment in day schools.

For high schools the variability for the proportion of total enrolment has a range of from 4 % to 29 %, while the high school teachers receive from 9 % to 44 % of the money devoted to teachers' salaries. The median for high school teachers is 21.2 % of the total amount spent for salaries, while the median for the enrolment in high schools is 9.9 % of the total enrolment in day schools. In seventeen out of twenty-nine cases, the proportion of the total amount spent for salaries which is spent for high school teachers' salaries is two, three, or even four times the proportion which the high school enrolment is of the total enrolment. Of the remaining twelve cases, seven show a proportionate expenditure for high school teachers' salaries almost double the high school's proportion of the total number of pupils.

The number of pupils enrolled per teacher in the elementary schools varies from 35 to 54, while in the high schools the number varies from 17 to 43. The median number of pupils per teacher is 44 for the elementary schools, and 27 for the high schools. In general, the enrolment per teacher for the elementary schools is about one and one-half times the enrolment per teacher in the high schools.

If we may take the amount spent for salaries as an index of the relative cost of high and elementary school education, we must conclude from the data given above that secondary education costs two, three, or even four times as much per pupil as elementary education. What we would like to have is the expenditures for high schools separate from those for elementary schools in order to be entirely certain of the relative cost of elementary and secondary education. I believe, however, that

TABLE XLV

	Number of City.	Total Number of Pupils Enrolled; Average for Two Years.	Number of Elementary School Pupils; Average for Two Years.	Number of High School Pupils; Average for Two Years.	Total Amount Spent for Teachers' Salaries; Average for Two Years.	Amount Spent for Elementary School Teachers' Salaries; Average for Two Years.	Amount Spent for High School Teachers' Salaries; Average for Two Years.
6.		4,286	3,796	490	86,850	65,350	21,500
7.		2,200	1,911	289	31,123	22,396	8,732
8.		2,436	2,139	297	39,570	30,845	8,725
13.		4,049	3,765	284	60,395	51,545	8,850
14.		1,738	1,598	140	25,932	28,957	4,975
15.		5,587	5,038	549	75,531	62,137	13,394
16.		1,220	1,136	84	17,285	13,432	3,853
20.		2,969	2,662	307	42,436	33,184	9,252
27.		2,167	1,831	336	22,595	16,413	6,182
28.		2,231	2,143	88	28,583	23,927	4,656
30.		3,747	3,428	319	76,185	59,628	16,557
31.		3,651	3,433	218	43,992	36,193	7,799
32.		2,999	2,728	271	41,268	35,268	6,000
34.		1,867	1,684	183	30,843	24,285	6,558
35.		5,162	4,407	755	82,351	66,891	15,460
36.		1,633	1,350	283	24,439	18,102	6,337
37.		3,255	2,886	369	30,491	23,262	7,229
39.		1,981	1,641	340	30,652	22,362	8,290
40.		2,138	1,510	628	30,963	17,402	13,561
41.		4,533	4,022	511	54,086	42,803	11,283
42.		4,214	3,798	416	48,937	37,687	11,250
43.		3,094	2,636	458	46,301	36,244	10,057
45.		4,142	3,867	275	60,237	48,537	11,700
48.		1,161	1,098	63	12,099	10,424	1,675
52.		4,978	4,680	298	58,192	50,555	7,637
54.		1,949	1,803	146	38,300	31,650	6,650
55.		2,440	2,201	239	21,762	18,200	3,562
56.		2,126	2,029	97	39,725	36,175	3,550
57.		3,072	2,692	380	74,495	55,645	18,850

TABLE XLV (Continued)

Per Cent. of the Total Number of Pupils who are Enrolled in Elementary Schools; Average for Two Years.	Per Cent. of the Total Amount Spent for Salaries; that is, Spent for Element- ary Teachers' Sala- ries; Average for Two Years.	Per Cent. of the Total Number of Pupils who are Enrolled in High Schools; Aver- age for Two Years.	Per Cent. of the Total Amount Spent for Salaries; that is, Spent for High School Teachers' Salaries; Average for Two Years.	Number of Pupils per Teacher for Ele- mentary Schools.	Number of Pupils per Teacher for High Schools.
88.5	75.2	11.5	24.8	43	22
86.9	72.0	13.1	28.0	50	25
87.7	77.9	12.3	22.1	47	27
93.	85.3	7.	14.7	38	30
91.8	80.9	8.2	19.1	35	23
90.1	82.3	9.9	17.7	48	31
93.1	77.6	6.9	22.3	35	17
89.6	78.3	10.4	21.7	49	28
84.4	72.6	15.6	27.4	47	31
96.1	83.7	3.9	16.3	44	18
91.4	78.2	8.6	21.8	38	26
94.1	82.2	5.9	17.8	38	24
90.9	85.4	9.1	14.6	47	36
90.1	78.8	9.9	21.2	39	23
85.4	81.2	14.6	18.8	38	34
82.8	74.2	17.2	25.8	42	27
88.5	76.3	11.5	23.7	54	34
82.9	72.8	17.1	27.2	37	30
70.6	56.2	29.4	43.8	49	34
88.8	79.1	11.2	20.9	47	30
90.2	77.0	9.8	23.0	56	29
85.3	78.3	14.7	21.7	40	36
93.4	80.6	6.6	19.4	43	19
94.7	86.1	5.3	13.9	48	21
94.0	86.9	6.	13.1	50	35
92.5	82.6	7.5	17.4	35	20
90.2	83.6	9.8	16.4	54	43
95.4	91.1	4.6	8.9	46	24
87.7	74.7	12.3	25.3	38	22

the item of salaries is a good index, first, because the item of salaries forms from 60 % to 80 % of the entire budget; and, second, because other expenditures for books, supplies, and apparatus are enough larger, in proportion to the number of pupils enrolled, in the high school to offset an expenditure of the same amount per pupil for janitors' salaries, fuel, repairs, etc.

CONCLUSION

This section will give a brief general summary of the results which have already been obtained, and some practical suggestions which grow out of these facts. First, with regard to variability, it will be remembered that the cost per pupil for the maintenance and operation of schools in the cities considered varies from \$9 to \$55. That this variation in the total cost per pupil is not due entirely to the relative wealth or poverty of the different communities is shown conclusively when we know that the cost of schools in cities in the United States varies from 6 % to 46 % of the total city expenditure.¹ An equally striking variability is found in the cost per pupil for each of the principal items of expense. Even when cities spending about the same amount per pupil are considered, it is found that the distribution of the money among the several items seems not to show anything like the degree of uniformity which might be expected (see page 44). It is found that the percentage of the total cost of maintenance and operation which is spent for teaching and supervision varies from 44 % to 82 %; and what possibly seems more astonishing is the fact that the city spending the smallest proportion for teaching and supervision, spends the smallest total amount per pupil. Janitors' salaries amount to from 3 % to 9 % of the budget; one city spends 3 % of its money for fuel and another spends 12 % for the same purpose; text-books and supplies cost from 1 % to 13 % of the total cost of maintenance and operation.

Fuel costs three times as much per pupil in one city as in another. The expenditure per pupil for the salaries of high school teachers varies from one and one half to four times the cost per pupil for salaries of teachers in the elementary schools.

¹ These results are from an unpublished study by Mr. E. O. Elliott, and were obtained by using the data found in the bulletins of the Commissioner of Labor.



In our consideration of relationships we found that an expensive school system is one that spends more than the usual amount for all of the principal items of expense. A large positive relationship exists between the proportion spent for supervision and the proportion spent for text-books and supplies. A lack of relationship between the total cost per pupil and the proportion which is spent for teaching and supervision seems to indicate that additional expenditures may not mean, as they should, a greater proportion for those items which count most for the efficiency of the schools.

These and the many other facts which are given above concerning the variability and interrelation of the principal items of expense for schools, prove conclusively that the problem of the business administration of city school systems is not only a real and vital one, but also that we may expect that the schools will increase in efficiency when the money devoted to public education is distributed among the various items in the best possible way. As has been stated, our final test can only be found by testing the pupils in the schools in order to rate different systems for efficiency, and then we must conclude that those cities which get the best results for a given expenditure per pupil are the cities which properly distribute their money. However, before any such comparison among the various cities can be made, we must have more detailed information with regard to the way in which the money is used. If we may not ask city superintendents or boards of education to report their expenditures according to a certain fixed form, it does seem that we might insist that their reports tell us for just what purposes the money is spent. A report which gave the various items of expense in detail would enable any one to compare cities according to whatever classification seemed best. Nor would such reports be without their value to the persons making them. If the administrator of schools is to secure additional money, either for purposes for which money is already used, or for any new field of activity, he can have no better argument than to be able to show just what results are obtained in his own and other cities from a given expenditure. Suppose, for example, that a superintendent wishes to introduce manual training or domestic science; he will be met immediately by the statement that these "fads" are expensive and not at all necessary as a

part of public education. Now, if it were possible for him to show from the reports of other cities that the additional expenditure was comparatively small, and that results obtained in the way of retaining pupils in school were considerable, he could make an argument which would have some weight.

If the greatest economy is to be had, it is essential that the accounting should show just how much money is spent for each item, and, within a system itself, how various schools compare. It should be possible for the administrative officer to tell just what the cost per pupil is for each school within the system, and to compare the relative cost with the relative efficiency as found by testing the pupils of each school. No great corporation would to-day continue to spend money for purposes for which no results could be shown, and no school system should so report its expenditures that it is impossible to tell how much the educational policies cost which it advocates and carries out.

It seems hardly right to expect that a superintendent whose time is already overcrowded, and who has as his assistant a clerk worth \$500 a year, should be asked or expected to originate or carry out any such policy of accounting as has been suggested above. But when we recall again the great variability which is found for those items of expense which might be expected to be fairly constant, we feel that it is not out of place to suggest that the salary of a competent business agent or director might be paid out of the savings which would be made by the proper administration of the business affairs of the schools, and that the efficiency of the schools might be increased as the result of the proper distribution of the money spent. When the best judgment is used in the purchase and use of supplies and equipment as well as in the selection of teachers and supervisors of instruction, when the money which is spent for schools is properly distributed among the various items of the budget, when expenditures are shown in reports in connection with the results obtained, then our schools will be found to have improved in efficiency, and then they will be able to command the respect and increased support of the community.

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